

CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

SPECIAL ISSUE:

THE CIO 100

Companies
Where Quality
Counts

AUGUST 1991

VOLUME FOUR NUMBER ELEVEN

SEVEN DOLLARS

Stouffer Hotels and Resorts
Debra Kristopsky

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CIO

VOLUME 4, NUMBER 11

SPECIAL ISSUE: THE CIO-100

The Qualitative Difference

By making quality a defining competitive tool, this year's CIO-100 companies lead a new business movement in which IT figures prominently. *By Allan E. Alter*

20

"Q" Tips

Quality connoisseur Curt Reimann expects companies that undergo the Baldrige process to emerge with a knowledge of their own shortcomings and a renewed dedication to excellence. CIOs whose organizations accept his challenge are in for the workout of their careers. *By Thomas Kiely*

26



Cover photo by
Jack Van Antwerp

The Fabric of Quality

Like the textiles it makes, Milliken & Co.'s Baldrige Award-winning efforts in quality have been patterned and woven into every aspect of company life. *By Meghan O'Leary*

34

Who, What, Where, When . . .

A chart listing all of the 1991 CIO-100 companies, along with information about their top IS executives.

92

Meet the Judges

Members of the 11 panels that selected the CIO-100 industries and organizations.

98



A seamless
quality effort 34

QUALITY ESSAYS AND PROFILES

Automotive

In the auto industry, quality means assembling many thousands of precision parts in a defect-free package; it can also mean sending technicians into the field to observe how shoppers load groceries into their cars. *By George Harrar*

42

Banking

Banking may have fallen on hard times, but a few institutions have committed their human and technological resources to the strategic pursuit of quality. *By Thomas Kiely*

46

Computers & Communications

For IT vendors, quality means anticipating user needs and delivering the right innovation to the right customers at the right moment and for the right price. *By Leslie Goff*

50



The road
to excellence 42

M O R E ► ► ►

A black and white photograph of a rolled-up scroll. The scroll is unrolled in the middle, revealing a piece of parchment with a large, ornate initial 'D' and the text 'Don't seek and you shall find.' in a gothic-style font.

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seek and you
shall find.

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QUALITY ESSAYS AND PROFILES (continued)

Consumer Electronics & Appliances

Japanese companies prove that IT is no substitute for making quality an integral part of the engineering and manufacturing process. *By David Freedman*

56

Electronic Devices

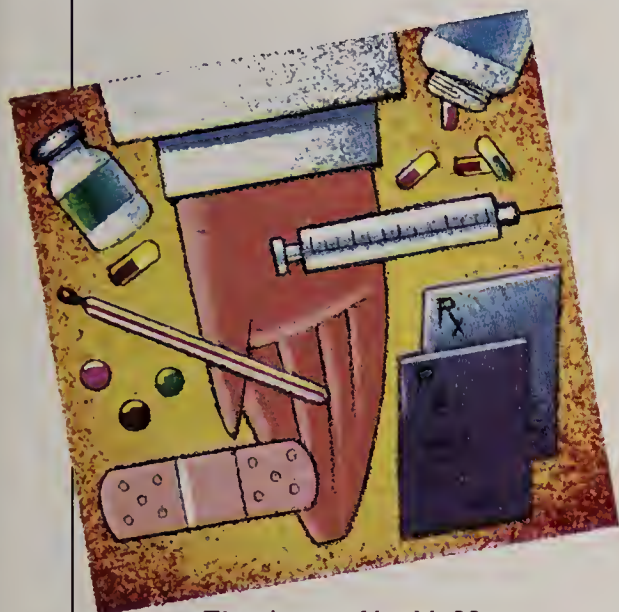
In an intensely competitive commodity industry, customer loyalty is hard to win and easy to lose, and having approximately perfect products is only the beginning of quality.

By Glenn Rifkin

62



When chips are up 62



The picture of health 66

Health Care

Computers are moving out of billing offices and into examining rooms, where they are helping care givers with prevention, diagnosis and research. *By Kathleen Melymuka*

66

Hospitality

IT can help hospitality providers maintain quality control and track customer preferences. But front-line employees are the real measure of service. *By David Freedman*

70

Pharmaceuticals

Drug companies have always manufactured a high-quality product. Now some are using IT to cut the lengthy development and approval process. *By Kathleen Melymuka*

76

Transportation

Carrier services turn to customized products, streamlined reservation systems and intermodal transport now that being on time is no longer enough. *By Meghan O'Leary*

82

Utilities

Increasingly, electric companies are seeing the light on quality, implementing programs that address issues ranging from conservation to improved customer service. *By Leslie Goff*

86



On the right track 82



Pro bono publico 12

DEPARTMENTS AND COLUMNS

Editor's Letter 6

Publisher's Letter 10

Trendlines 12

- ▶ Technology and infrastructures
- ▶ Parking scofflaws
- ▶ Systems developers survey

- ▶ Career moves
- ▶ Chapter 11 for America West
- ▶ Shrinking bonuses
- ▶ Weiner facts
- ▶ Hopkins competition
- ▶ Quality help
- ▶ Data security

- ▶ Career planning
- ▶ ISDN support

State of the Art 100

Events/Index 104



Early this year when our editorial team began discussing possible themes for our fourth annual CIO-100, it became evident that the issue of quality was at the forefront of corporate consciousness.

As in past CIO-100s, we examined our subject both from a broad perspective and by its effect on individual industries and companies. Special Projects Editor Allan E. Alter directed the project, interviewing a host of quality gurus to determine the 10 industries making the most concerted effort to achieve total quality. The industries we selected are automotive, health care, consumer electronics and appliances, electronic devices, hospitality, utilities, transportation, banking, pharmaceuticals and computers and communications.

To paint the broad view of the quality movement, Senior Writer Tom Kiely interviewed Curt Reimann, director of the Malcolm Baldrige National Quality Award program at the National Institute of Standards and Technology. Reimann emphasized that the success of quality programs is inextricably entwined with an enterprise's ability to manage information. Apparently the quality effort is starting to explode—although just over 100 companies will compete for the Baldrige, Reimann estimates NIST will distribute more than 250,000 copies of the application guidelines. Many enterprises are taking the Baldrige criteria to heart, even if they don't actually compete.

For a detailed picture of the corporate values necessary to make quality a way of life, Senior Writer Meghan O'Leary visited textile manufacturer Milliken & Co., a 1989 Baldrige winner. Generally press-shy, Milliken revealed the extent to which its quality effort is tied to human capital and cultural change. As Milliken's value system puts it, "the hard stuff is easy, the soft stuff is hard."

And special thanks are due to our editorial team. As usual, our editorial group, aided by our regular freelance cadre—David Freedman, Kathleen Melymuka and Leslie Goff and contributors Glenn Rifkin and George Harrar—went all out in delivering portraits of the industries and companies at the leading edge of the quality endeavor.

Managing Editor Lew McCreary kept the formidable project on track with his great humor and editing prowess. Associate Editor Abbie Lundberg and Copy Editor Leigh Buchanan kept us honest and on schedule and polished our words. Editorial Researcher Megan Santosus, aided by Editorial Assistant Mina Ahn, pulled our survey together and provided support.

Art and Design Director Mary Marshall and Assistant Art Director Moira Gillis gave free rein to their creative powers in designing a special look for this issue.

Finally, we congratulate the winning organizations. In their pioneering emphasis of the quality process, they are models for the rest of us to watch and learn from.

Marcia Blumenthal



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David V. Evans
Vice President
Director, Information Systems
J.C. Penney



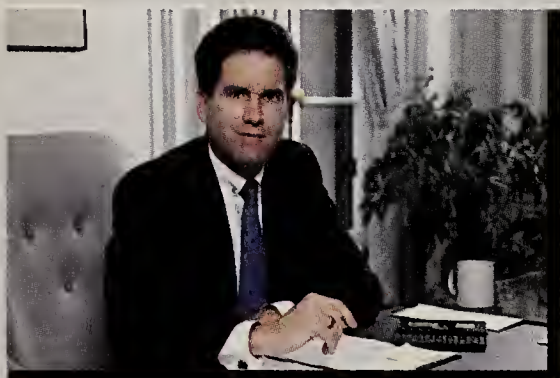
"Our On-line Banking system has been in production for more than 12 months—500,000 transactions a day—without a single code failure. And we had very few enhancements to do. Our users got what they needed the first time out."

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Senior Programmer/Analyst
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Executive Vice President
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"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

Paul R. Hessinger
Chief Technology Officer
Computer Task Group



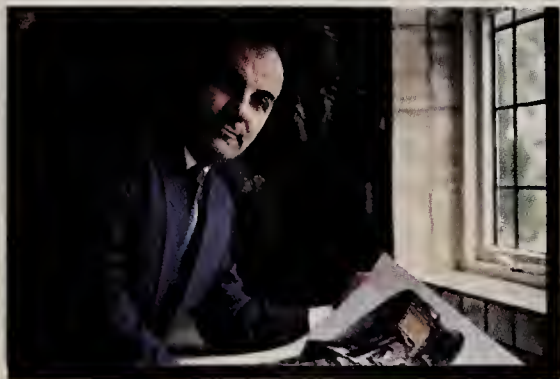
"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

John F. Mott
President
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Giorgio Sorani
Division Head - MIS
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"We are using the IEF to develop a new generation of manufacturing systems replacing over 300 existing systems. We estimate that IEF will increase our productivity by between 2-to-1 and 3-to-1 for new systems development."

Wal Budzynski
Head of Operations, Systems/Computing
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Venkat (Vinnie) Tiruvilumala
Director, CPC/CPIC Information Systems
SONY Corporation



"Our first IEF system was completed faster, and with fewer errors, than any system I've ever seen. If I had to go back to the old ways, I'd find another job...outside the DP world. It means that much to me."

Mogens Sorensen
Chief Consultant
Nykredit (Denmark)

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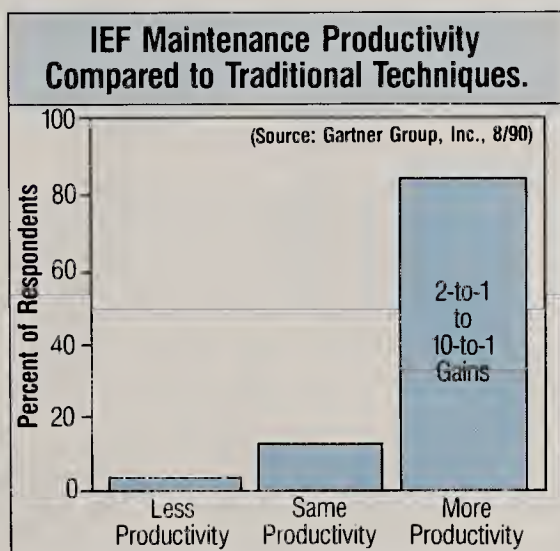
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) IEF developers reported zero defects—not one abend had occurred in IEF-generated code.

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, more than 80 percent had experienced gains of from 2-to-1 to 10-to-1. (See chart.)

Specifications always match the executing application.

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Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

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We are in the midst of the information age. And information technology is the key to our success. Organizations around the world continue to invest billions of dollars annually in information technology. It permeates every facet of life and affects every decision we make.

In the race to safeguard America's competitiveness, information technology products and services have never been more important. And management's demand for information has never been greater, as more and

more executives realize that access to the right information at the right time often means the difference between success and failure.

The increasing sophistication of organizations in their use of information technology has created a new trend: Technology is not only helping to change and improve business processes, but is having a dramatic effect on the corporate culture as well.

In this, our fourth annual CIO-100 issue, you'll learn about the wide-reaching impact of information technology on quality, not just in the traditional product quality sense, but in the attitudinal change of an organization's people—how they do their jobs and deliver exceptional products and services to their customers.

This issue is dedicated to you—America's information leaders. Enjoy it.

Wayne L. Woz

P.S. There is still time to register for the Fall CIO Perspectives Conference, "IT and the Corporate Agenda: People, Productivity and Profits," to be held Sept. 22-25 at the Hyatt Regency in Monterey, Calif. For more information, please refer to the conference brochure included with this issue of the magazine, or call 800 366-0246.

Coming In CIO

From the Jaws of Defeat

Businesses at the end of their rope can sometimes spring back with a well-managed turnaround. But they are unlikely to succeed without IS offering critical support in charting a new course.

Chicken or the Egg

It may sound backward for a business to begin by putting its information systems in place and then distributing the company around them. But VeriFone Inc. did just that, and as a result has blossomed into a \$150 million company with a 65 percent market share.

Town and Gown

Universities with IS graduate programs are forming partnerships with companies that theoretically should benefit both sides. Representatives from business and academia discuss whether such alliances are making the grade.

Managing the Monster

Six companies facing the challenge of distributed computing present their strategies for coping with an environment as complex as that of a mainframe, but with few of the controls of the mainframe world.

PHOTO BY GEORGE SIMIAN

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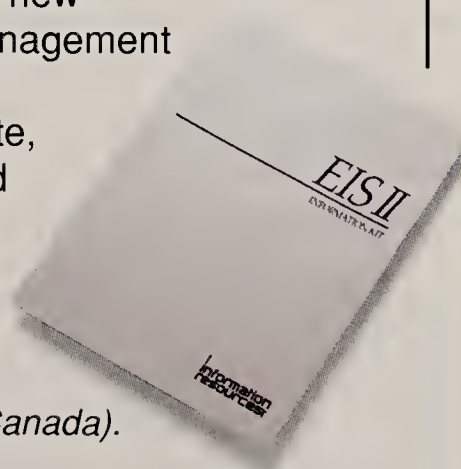
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TRENDLINES

POLICY

BRINGING IT TO BEAR FOR PUBLIC GOOD

The societal infrastructures and institutions of health care, road transportation, environmental protection and education are constrained from taking full advantage of the benefits of IT by restrictive public policies, according to John Diebold, the IT visionary who coined the term *automation*. Diebold is now forming a task force of U.S. and European

business and public leaders to identify and remove these impediments.

"Moving from the promise to the reality of information-

based societal infrastructure—for example, health care systems linking patient, physician, specialists and hospitals—is more a function of appropriate public policy than it is a matter of technology," said Diebold, chairman of the Diebold Institute for Public Policy Studies Inc. in Bedford Hills, N.Y. (see "Diebold New World," *CIO*, June 1991).

Diebold's task force will be butting heads with such entrenched obstacles as legal restrictions on private sector involvement in public sector activities; the dispersed, competitive nature of many infrastructure components; and even the attitudes of the general public.

One of the first areas for study will be road transportation. Commuters idling away their time in the daily rush-hour jam no doubt wonder why "they" can't fix it so automobile traffic runs as smoothly as airport traffic. Indeed, while automation has been brought to bear successfully on airline and railroad infrastructures, our highways remain relatively untouched by technology. The culprit is the public nature of the system and policies that discourage private interests from getting involved.

Diebold's panel plans to identify and disseminate alternative policies that encourage the application of IT in this area. If the effort is successful, drivers could benefit from

centralized accident monitoring and traffic-rerouting systems that manage traffic flow and ease urban congestion.

If it fails, the drive home could get a lot longer. The U.S. Federal Highway Administration estimates that without intervention, urban traffic will increase as much as 50 percent by the year 2005, and an average urban freeway trip in the year 2010 will take 2.4 times as long as it does today.

Diebold's Information-Based Infrastructure Project, which expects to begin work in September, is funded by the Alfred P. Sloan Foundation and supported by the European Community. ■

ENABLERS SOUGHT

Johns Hopkins University is asking teachers, programmers, engineers and students to come up with high-tech ways to eliminate barriers for people with disabilities.

A grand prize of \$10,000 and more than 100 other prizes will be awarded for systems, devices and computer programs designed to help people with physical and learning disabilities. The university sponsored a similar competition in 1981, and some of the winning entries have become industry standards. They include a talking computer terminal for the blind and a system that allows the severely disabled to communicate with synthetic speech.

The Johns Hopkins National Search for Computing Applications to Assist Persons with Disabilities is accepting entries through Aug. 23. For information, write CAPD, P.O. Box 1200, Laurel, Md. 20723. Or call 301 953-5365. ■

QUALITY HELP FOR THE LITTLE GUY

This year's CIO-100 has shown that the quest for quality is pervasive among companies from Stuttgart (Germany) to Berlin (Connecticut). It has also shown that the Goliaths of the business world can benefit as much as the Davids from a commitment to quality improvement. But companies with fewer than 500 employees don't always have the resources to develop an internal quality department or hire outside consultants to help them implement the necessary changes. Fortunately, according to Ron Asbury, director of quality consulting at Texaco Inc. and author of the column on consulting options that appears in this issue (see "Caveat Emptor," Page 100), there are several places small businesses can turn for help:

- **INDUSTRY ASSOCIATIONS** are creating networks of like businesses that can share experiences and expertise. Many of these associations have adopted a quality philosophy, and some are devoting their conferences to the quality theme.
- **LARGE CLIENTS** are often willing to help their smaller suppliers implement quality processes. Smart corporations recognize the bottom-line impact of such largess: Customers will realize that if their supplier is producing quality products and services, that in turn will translate into improved products and services for them.
- **COLLEGES AND UNIVERSITIES** are beginning to include quality improvement courses in their curriculums, particularly at the graduate or business school level. Smaller businesses acting as laboratories for research projects or as subjects for graduate papers can benefit from the students' expertise. ■



TRENDLINES

FRANKLY, NATHAN'S, WE DON'T GIVE A DAMN

Were they confusing footprint with foot-long? CASE with casing? Base memory with baseball?

We won't waste time pondering what strange misconceptions prompted the public relations firm handling Nathan's Famous Hot Dogs to send CIO a hefty package of releases on that company's expansion plans. Although IS received nary a mention, we found



the background material strangely compelling. Having pored over it (with relish, of course) we offer a few tasty tidbits:

Nathan's founder—Nathan Handwerker—learned his trade from Charles Feltman, the inventor of the modern hot dog. Handwerker opened his own restaurant after Jimmy Durante and Eddie Cantor, then destitute saloon entertainers, complained that Feltman's weiners were too pricey.

Nathan's hot dogs are still flavored with the proprietary spice formula devised by Nathan's wife, Ida, in 1916.

The original Nathan's sign, currently in place at Coney Island, has been requested for display by the Smithsonian Institution. ■

LAW ENFORCEMENT

BOOTING UP

In the 1970s Australian film "Walkabout," two children set off on their own through the bush for a journey of mystery and adventure. In the 1991 U.S. version, the journey is made by a lone parking enforcement officer, the Walkabout is an 8-inch-by-8-inch computer slung over his or her shoulder and the terrain is your ordinary city street.

It works like this: The officer approaches the illegally parked car and enters its license plate number, using the Walkabout's alphanumeric keypad. Faster than a wild dingo, the computer scans a "scofflaw" database for the number and, if the driver owes money for parking tickets, alerts the officer to call for the Great Immobilizer—a Denver boot.

If the car has no current violations on record, the DOS-based 80286 personal computer, which weighs 4 to 5 pounds depending on the type of battery, prints a parking ticket on a 40-character thermal printer and stores the

license number, date, time, place and other data in its memory (up to 4MB). Data is uploaded from the Walkabout unit to desktop PCs at the end of the officer's shift.



The manufacturer, PolySoft Systems Corp. of Baltimore, developed a parking enforcement program for the city of Camden, N.J., that generated \$225,000 in revenues from parking fines, towing charges and booting fees by the third quarter of 1990. The money (more than double 1988 rev-

enues) paid for the computer system, which required little investment in equipment or human resources.

PolySoft has developed similar systems for fire, building, health, sanitation and liquor control enforcement. "The Walkabout's open architecture lets it exchange data with almost every type of computer system used by municipal governments," said

President William Dorsey.

"And no data is lost to bad weather or incorrect reading of handwritten notes."

Camden officials plan to buy more Walkabouts to enforce residential parking regulations. Camden residents, we're sure, respond with a collective "Oh, goody." ■

UNEXPECTED TURBULENCE

Despite its reputation for excellent service and its conservative approach to building an IT architecture, America West Airlines' growth has proved a little too explosive for the Phoenix-based carrier, whose CIO, Carl Faulkner, graced the cover of the June CIO. The company announced late in June that it is filing for Chapter 11 and will devise a plan to reorganize its debt structure. "We have explored many alternatives in the last few months to arrange financing to see us through the most difficult time in the airline industry's history," said Edward R. Beauvais, the company's chief executive officer.

The airline promised travelers that it will conduct business as usual, and even inaugurate two new routes, as it works out payment plans with its business partners. ■



We Can Sum Up Approach To I-CASE



Face it, I-CASE hasn't lived up to expectations. That's because its one-size-fits-all and hyper-integrated dogma promotes excessive rigidity and limitations, and fails to take into account real world scenarios.

At INTERSOLV, experience has taught us that you can't build applications in a hyperintegrated and closed environment. Our unique solution—the benefits of I-CASE, but with a modular implementation approach that reduces up-front costs

and risks—takes into account the true realities of the 1990's development environment.

In short, our solution works because it gives you full lifecycle coverage and all the functionality you need without forcing you to change your culture and projects to fit a rigid model tool set.

What's more, our LAN-exploited products—Excelsator for Analysis and Design, APS for Application Generation, PVCS for Configuration Management and Design Recovery for Re-Devel-

Our Competitors' SE In Two Words:

LOST

opment—work standalone, together, or can “snap” into your current culture.

Add to that our commitment to an open architecture and adherence to industry standards



such as IBM's AD/Cycle, and you have the flexibility needed to ensure on time, on target delivery of high impact IS solutions.

Ask our customers. There are over 100,000 who count on us every day. They'll tell you how our approach opens up a world of possibilities for them.

For more information on the right solution, and a free copy of a management report entitled, "I-CASE In An Open Architecture: Increasing ROI, Reducing Risk," write: INTERSOLV, 3200 Tower Oaks Boulevard, Rockville, Maryland 20852. Or call 1-800-547-4000 ext. 9207.

**I-CASE
In An Open
Architecture:
Increasing
ROI,
Reducing
Risk.**

INTERSOLV

The CASE Company You've Been Waiting For:

TRENDLINES

TO BE, OR WHAT TO BE?

When it comes to your career, do you ever have the feeling that you'll hit the ground at Mach 1 before you can pull the cord of that parachute (never mind its color) strapped to your back? A number of career-guidance software programs—created with the vocationally ambivalent in mind—are designed to point the way toward occupational bliss.

One such program, the descriptively named "Career Design" (from Career Design Software of Atlanta), is an interactive career-planning tool based on the principles found in the book *What Color Is Your Parachute?* The program was sent unsolicited to our editorial department.

Through a series of menu-driven self-help exercises, Career Design promises to help the professionally confused identify a windfall of personal skills, uncover long-dormant aspirations and prepare responses to those pesky questions most commonly asked by employers.

The brochure made it sound both fun and personally enriching. Sadly, unforeseen technical difficulties made installation of the software impossible. So the discovery of our true callings (if we haven't stumbled upon them already, of course), must wait until our overburdened network relinquishes some megabytes or certain pieces of hardware start behaving.

At least we discovered that we probably don't have futures as CIOs. ■

COMPUTER SECURITY

DISPELLING THE BOGEYMAN

Horror stories about viruses and hackers have caused panic among many users of PCs, workstations and LANs and generated a healthy market in antiviral devices. This hysteria over perceived threats is diverting attention from the more prevalent, if mundane, security issues that apply in a downsized environment, according to Thomas V. Sobczak, execu-

tive vice president of Application Configured Computers, a Baldwin, N.Y., consultancy and developer of nontraditional security devices.

Sobczak has questioned more than 400 users, primarily from the areas of government and finance, about what they perceived to be the greatest threat to their own computer security. He found that most knew little about the

subject and harbored mental images of powerful, corruptive forces in the forms of viruses and hackers. When asked to reevaluate the threat following education and training, however, these same individuals produced a significantly different, far more prosaic list. Mentioned most frequently was curiosity, a nonmalevolent factor that can be managed relatively inexpensively using access controls and limitation. While 50 percent of respondents initially cited viruses as the principal threat to their security, only 10 percent did so after attending instructional lectures and seminars.

Computer security has become a sensational subject that could stand a breath of realism, Sobczak insists. Organizations would be wiser to spend their money on fire alarms rather than fallout shelters. ■

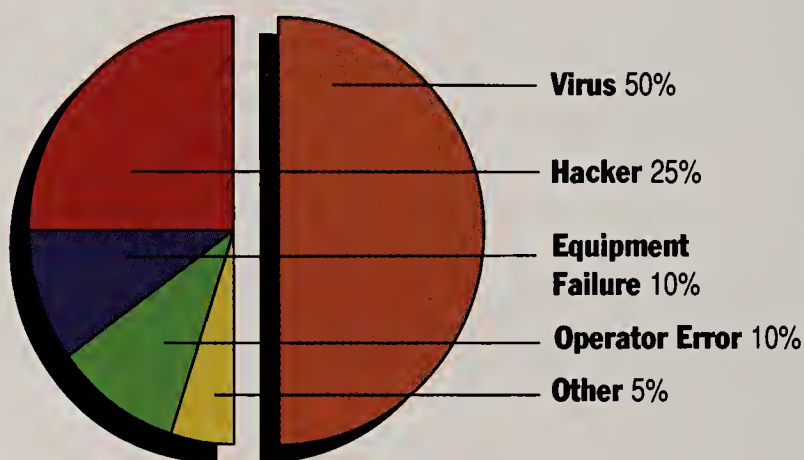
STILL TICKING

Increasing interest in Integrated Services Digital Networks? Can it be? Yes, according to a recent study by Business Research Group.

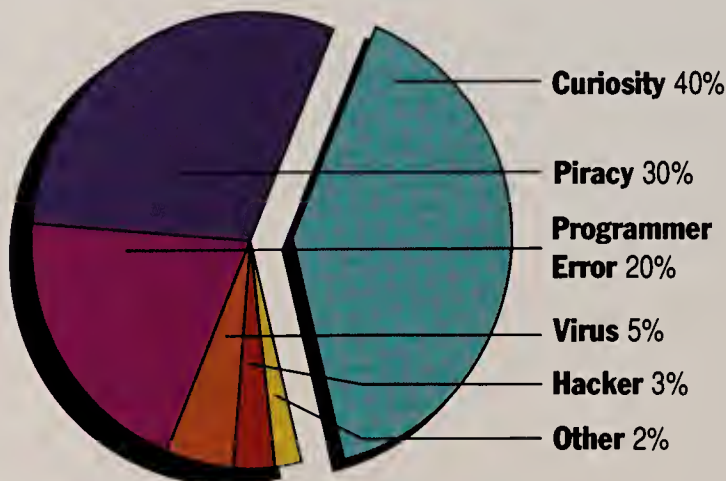
The consulting firm's poll of 250 companies showed 17 percent use ISDN. Twelve percent have definite plans to use it, and 26 percent are evaluating it. Of those intending to install ISDN within a given period, more expect to implement it within two years than within 12 months.

Despite apparent gains, some aspects of ISDN are still moving at continental drift pace. For instance, the regional Bell operating companies, which now have ISDN on fewer than 1 percent of their access lines, will increase that figure only 2 percent by 1995, Business Research Group predicts. ■

Perceived Threats



Real Threats



SOURCE: APPLICATION CONFIGURED COMPUTERS, INC. (1990)

**There
must be a
reason why
a company
grows by 100%
in just
4 years.**

**There must be
a reason why
MCI's 800 Service
grew from
0 customers
four years ago,
to more than
100,000 today.**

Customers seem to like how quickly we respond, as much as they like the quality of the response. And the fact that before we do anything, we listen. Listen to what the problems are.

MCI® has one of the world's most modern telecommunications networks, but the big reason we grew so far, so fast, is how we put it to work. For each customer.

MCI 800 ServiceSM is always tailored to your company, not simply sold off the shelf or in packages that don't fit your needs.

Those needs can range from customer service to sales and marketing to internal communications. MCI 800 Services can be tailored to route calls to the right people and places, quickly. Either automatically, or by menu.

Peak loads can be planned for, overflow calls can be shifted automatically to other locations.



**Maybe it's
how fast we
react to them.**

Calls can be managed by time of day, geography, product lines, zip codes, etc.

Your customers get their problems solved and your employees get the information they need quickly and easily. And changes in service can be quickly made on line—on your own or with MCI help.

We can help with fast installation when you need it as well. This can mean having MCI 800 service up in under 24 hours.

And if things go wrong—power failures, personnel shortages—emergency plans can be standing by. We know how critical your 800 service is to your business.



If you have international customers (or would like to), MCI can make your connections with 28 countries, and more are on the way. Toll-free calling can

MCI 800 Service

24-hour installation for last minute needs.

Emergency backup and on-line control available.

Flexible call routing by time, geography, menu, department, zip code.

Significant cost saving/controls, along with unsurpassed quality.

International, national, regional, local.

© MCI Telecommunications Corporation 1991

attract new customers, keep suppliers plugged in, and traveling employees in contact.

Beyond fast service from MCI, you can also look for comprehensive management reporting. Information that helps you control costs, build lead lists, track responses, and more.

MCI's spectacular growth has been based on delivering the value, the products, and the responsive people of MCI. And the quality and reliability of the entire worldwide MCI network. No wonder more than 100,000 companies have signed up with MCI 800 Service.

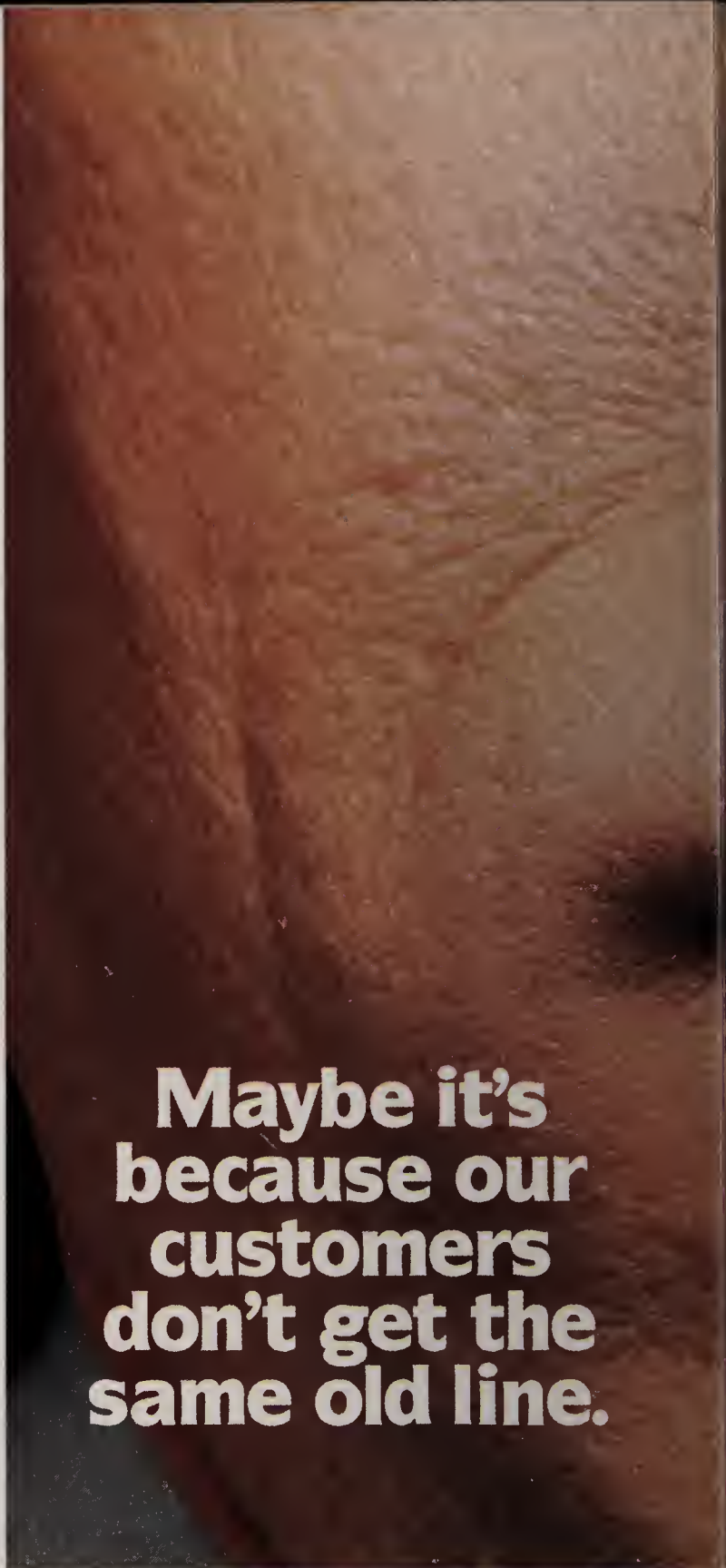
Call us and find out how fast we can move for you. Call 1-800-888-0800.

MCI[®]
800 Service

**There must be
a reason why
MCI's Vnet business
is 3 times bigger
than it was
2 years ago.**

Instead of "take-it-or-leave-it," instead of "that's the way we do it," there's another way of treating customers. The MCI® way. A real alternative. Including MCI's Vnet,® where we can show you the advantages of virtual networking. In short, the benefits of a private network without the cost of a private network.

In just a short time, MCI has built the capability to handle whatever you come up with. Voice, data, video and fax. Vnet is provided over MCI's predominantly digital network, with a robust advanced signaling system, along with the superior network intelligence and control you're looking for.



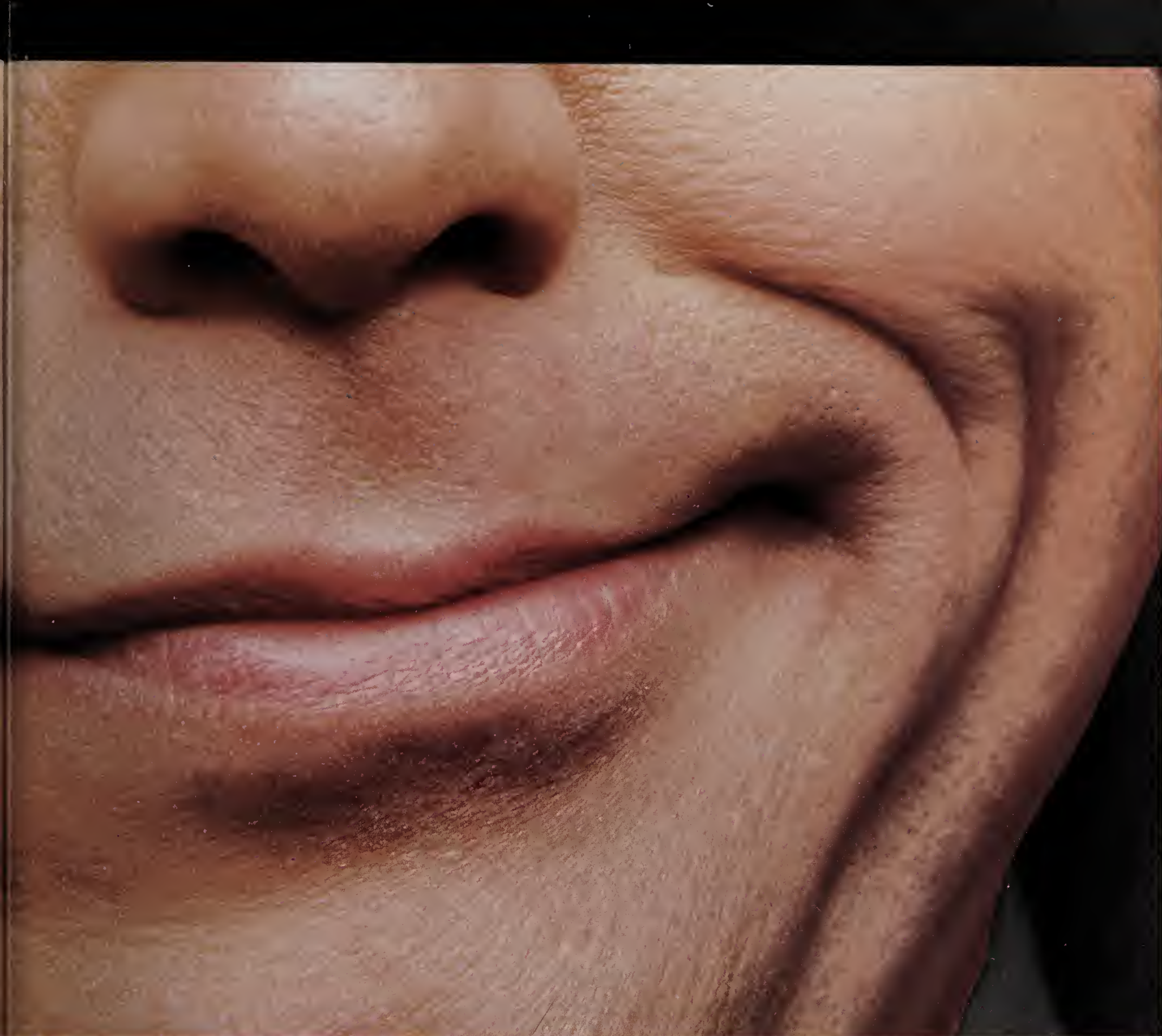
**Maybe it's
because our
customers
don't get the
same old line.**

It's state-of-the-art, and building. And that goes from building to building, continent to continent, end to end.

So, we have what you need, and we'll work with you to put together a network that fits those needs. Like: flexible dialing plans, customized routing and screening, on-line database management, switched data services, traveling employee access and network management.

In short, we have the features you want, and we can deliver them in short order.

And right on the money.



In fact, we've got an invoicing and reporting system that's the best in the industry. With the accuracy, flexibility, not to mention the timeliness,

MCI Vnet Service

MCI Vnet is a predominantly digital international network.
Superior network intelligence, with robust advanced signaling.
Full capability, efficiency and flexibility.
On-line database management.
Superior invoicing and customized call reporting.

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you need. Plus you're able to choose exactly where the information goes.

From minute detail to executive summary,

everyone can get just the information they need to get a handle on costs.

All this on top of the fundamental quality, reliability and value of the MCI network itself. All brought home to you by the very responsive sales, support and service people who simply won't give you the same old line.

No wonder MCI's Vnet has made virtually hundreds of virtual network customers very satisfied. Why not join them? Call 1-800-888-0800.

MCI[®]
Vnet

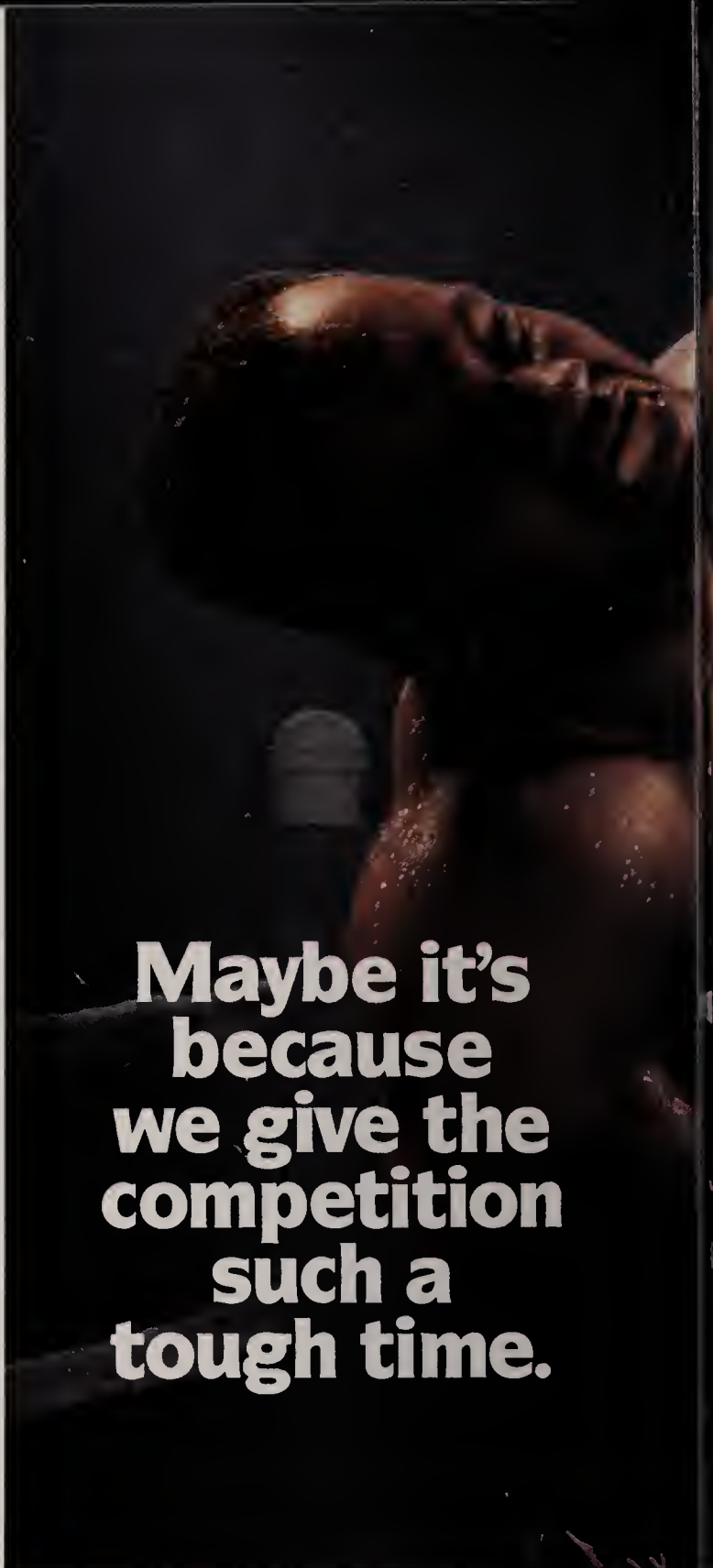
**There must be
a reason why
MCI's data
customers have
tripled their
business with
us since 1986.**

First MCI® shook up the industry in voice, and now—data. Along with an attitude that sets us apart from the other guys: we're easy on our customers, but mean to our competitors.

We're beating them to the punch by delivering high-speed Switched T-1 and Switched T-3 bandwidth on demand, whenever you need it.

But that's just the latest example of us working with our customers to develop flexible, high-speed, cost-effective communication services.

In fact, every day we handle everything from disaster recovery to time-sensitive fund transfers, to interconnecting LANs. All the while pushing for higher quality and lower costs. Like developing switched high quality video conferencing that's so



**Maybe it's
because
we give the
competition
such a
tough time.**

affordable, it's actually useable.

We're also the first to install SONET—for even higher bandwidth and higher speeds. Operating at 2.4 gigabits per second, and carrying 32,000 simultaneous two-way data circuits on one fiber pair, MCI again is leading the way to new transmission pathways for data, voice and imaging applications.

Another MCI innovation is our Digital Reconfiguration Service,SM so you can easily reconfigure your network or even add capacity, quickly and easily as traffic demands change.

No matter what, MCI people work with you



to put together the right technology, services, and creative solutions to meet specific applications.

And so that you're not trapped by techno-

MCI Data Service

High speed, high quality, high tech.

Switched 56, Switched T-1 and Switched T-3.

SONET multi-gbps/32,000 simultaneous 2-way channels.

Full capability and flexibility—worldwide.

© MCI Telecommunications Corporation 1991

logy or investments, these solutions can be adapted and modified as needs and times change, adding

to their efficiency and value.

And this extends around the world. Because the MCI data network extends internationally to connect the U.S. to more than 250 countries. So you can make use of MCI's data network quality and reliability—worldwide.

And to continue to give the competition a hard time, we're keeping the pressure on them (and ourselves) to come up with more innovations.

Keep your left
up, guys. Give us a
call. 1-800-888-0800.

MCI[®]
Data Services

There must be a reason why MCI® has grown so much. Maybe it's our more than one million business customers.

They discovered "the right choice" wasn't the only choice. Much less the best choice.

They called MCI.

For Data, Vnet and 800 Services. And more.

They found MCI had the products and services they needed.

They also found MCI people ready, willing and able to help meet their unique telecommunications challenges.

With answers that weren't off the shelf or off the cuff.

For more reasons why MCI could be the answer for your company, maybe you should call 1-800-888-0800.



TRENDLINES

CAREER MOVES

Manville Corp., of Denver, has named **CLIFFORD R. HALL** vice president and CIO of Manville Information Services Division. Hall had been an officer of United Technologies, parent company of US Sprint, since 1989, and executive vice president and CIO of Sprint since 1987. At Sprint, Hall presided over the turnaround of the IS function during a period of rapid growth at the company.

The U.S. Department of Commerce has appointed **BRAD RIGDON** to lead a government-industry task force charged with planning the development and implementation of standards to govern computerized product data in computer-integrated manufacturing and concurrent engineering applications. Rigdon is director of IS at McDonnell Douglas Systems Integration Co. in St. Louis.

TOM LUTZ recently left his position as CIO at steel maker Armco Advanced Material Corp. to pursue full-time consulting activities with his consulting firm The Lutz Group, of Mars, Pa. As CIO of Armco, Lutz led the overhaul of a non-integrated IS architecture. Before that, he directed the graduate program in IS management at Baylor University School of Business. He has also been a principal and director of education at Nolan Norton & Co. and head of IS at the Mayo Clinic and Foundation. The Lutz Group specializes in linking IT strategy to business strategy, outsourcing and resizing, and restructuring IS department to support business group integration. ■

IS PRIORITIES

THE DEVELOPING STORY

Now that we're in the thick of summer reruns, systems development directors can turn their attention away from "Twin Peaks" and concentrate on more earthbound issues, such as how to keep productivity up and end users happy.

Topping the list of priorities in the Index Summit Survey of systems development directors by CSC Index Inc. were increasing developer productivity (1), identifying and developing strategic information systems (2), responding rapidly to systems requests (3), and developing an information architecture (4).

The survey of 142 directors from large U.S. corporations (\$4.1 billion and over) reveals a group concerned primarily with increasing productivity, planning for the future and finding new strategic opportunities in today's troubled economy. Lower on the list, but still in the top 10, were dealing with maintenance, systems obsolescence and migration to new systems (5); achieving support for cross-functional systems (6); instituting a formal total quality management program in systems development (number 7, an issue that wasn't even ranked last year); demonstrating the value of development to senior executives (8) and managing end-user systems development (10).

In support of productivity, development directors are primarily concerned with implementing CASE tools (9), overcoming staff resistance to new development methods (11), developing and implementing metrics for systems development (13), experimenting with object-oriented programming (17), and developing outsourcing arrangements.

In addition to productivity concerns, three human resources issues ranked among the top 20: reorganizing systems development with fewer management levels and more autonomy for developers (12),

revamping compensation and career paths in systems development (14), and developing a new recruitment and selection strategy for IS development personnel (16). Of these, only the first was ranked as critical last year.

And as their companies explore new markets, development directors are concerned with creating a global information systems development capacity (15). It beats reruns of "Full House." ■

THE WAGES OF THIN

IS executives are finding that the saying "You can't be too rich or too thin" is only half true: This year their bonus envelopes are thinner by about one-fourth.

Bonuses for data processing and IS managers are down an average of 23 percent from last year, according to a survey by Edward Perlin Associates,

a management consulting firm headquartered in New York. The survey found that while IS managers' base pay rose by about 7 percent in 1991, their total compensation has actually fallen by about 1 percent.

Cutting bonuses is a smarter response to lean economic times than cutting base pay, according to Perlin. "It's especially impor-

tant in tough times to take steps to counter the threat of disruptive turnover of critical staff members by keeping their salaries competitive," explained John Warlikowski, a member of the firm. "Otherwise, some of them will move on when the economic climate gets better."

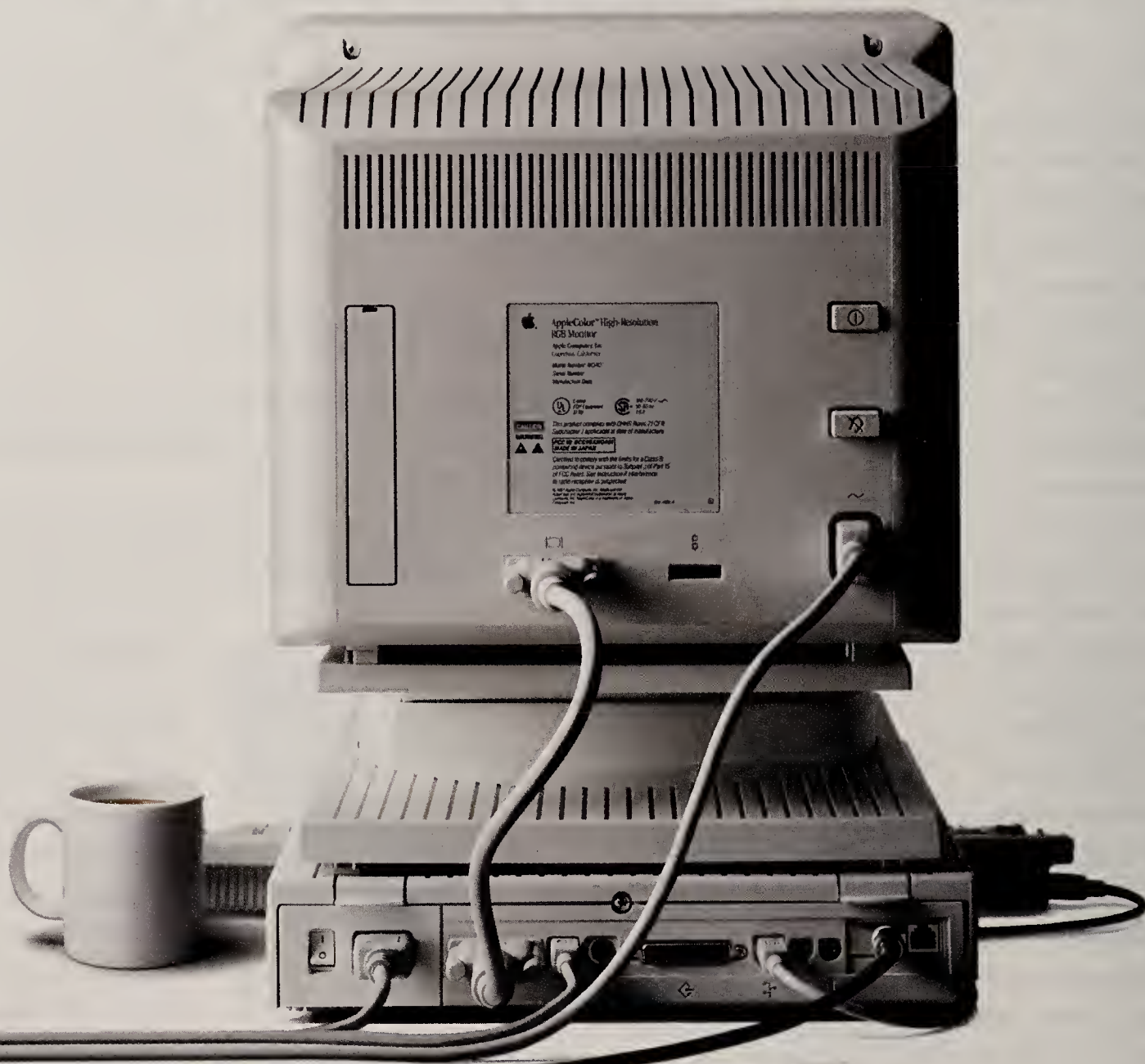
The IS executives surveyed average \$100,000 annually in total compensation. Perlin pointed out that cutting the bonuses of such well-paid employees has symbolic as well as economic value, showing the rest of the company that senior management is swallowing its share of medicine. ■

CORRECTION

In our May special issue on distributed computing, text accompanying a chart listing value added network operators (Page 103) incorrectly stated that the IBM Information Network, based in Tampa, Fla., does not support the X.25 protocol; it does. CIO regrets the oversight. ■



To a mainframe it's a terminal.



From the back, a Macintosh is as easy on IS managers as the front is on your people. The same coax cable that books to an IBM 3278 terminal plugs right into the Mac through an easily installed card. Just click the mouse, and it's configured.



We've been telling you, "We're open to anything." Well, that includes the biggest "anything" any IS manager has to manage — the mainframe.

"Open to anything" means an Apple® Macintosh® personal computer effortlessly fills in for a 3270, a 5250, or just about any other terminal.

And to a mainframe, Macintosh looks and acts just like a terminal. Matching all the protocols, running the same applications, meeting the same security standards.

Connecting a Mac® to a mainframe is also easier than

anything. Certainly easier for you than any other PC. There are no DIP switches. No CONFIG.SYS. No AUTOEXEC.BAT.

Just add a 3270 or Token-Ring card like the ones made by Apple, DCA, or Avatar. This plus terminal emulation software, and you're in business. Macintosh also replaces terminals at a lower cost than other PCs. One 3270 card can distribute up to 64 terminal sessions across all networked Macintosh computers over the AppleTalk® network.

From the human perspective, "open to anything" means giving your people easy access to all the critical information and applications that lie within the mainframe. Powerful

*There are two easy ways to do it. Simply add an application called SoftPC, or one of two cards from Orange Micro, the Mac286 or Orange386. **It really is free. But only while supplies last, and only in the U.S. One overview per of New Era Software, Inc. Mac286 and Orange386 are registered trademarks of Orange Micro, Inc. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. SoftPC is a registered trademark

To a person it's a Macintosh.



From the front, a Macintosh lets people be far more productive. Terminal emulation runs alongside thousands of consistent applications. All of which now have easy access to mainframe data.

front-ending tools put a Macintosh face on applications written in COBOL or other production languages. And using Apple's Data Access Language, Macintosh applications cooperate with a wide range of host-based SQL databases.

Which means people can take that information and make it more understandable, more valuable, and more actionable. Through programs like Microsoft Excel, dBASE Mac, WordPerfect, and Lotus 1-2-3 for Macintosh.

It means that Macintosh can read and write DOS files, run DOS programs*, and communicate with PCs — fitting easily into any corporate environment.

Of course Macintosh is, first and foremost, open to people. With all the qualities that make it the most widely imitated personal computer. We'd like to show you how the Apple Macintosh can make the most formidable computers you own even more powerful. The power to be your best.®

Find out how Macintosh can give new value to the information in your mainframes while making your people more productive. For a free overview, call **800-635-9550, ext. 740.****

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THE QUALITATIVE DIFFERENCE

**By making quality a defining competitive tool, this year's CIO-100
companies are leading a new business movement
in which IT figures prominently**

We knew quality had to be an important topic for CIOs. But we didn't appreciate how important it really was until we spoke to the director of the Malcolm Baldrige National Quality Award program, Curt Reimann.

"Information systems is a major theme of the Baldrige Award," Reimann said. "Quality-conscious companies are more data rich [than other companies]." CIOs who examine the Baldrige Award criteria may be "shocked to see all the [TQM] trails that lead to their doors."

This year's CIO-100 explores the trails that link IS and quality. If you've wondered what all the hoopla surrounding the total quality movement or the Baldrige Award means for CIOs, how IS has helped top quality enterprises get that way, or what you can do to improve the quality of your company's products, customer service operations and internal processes, read on. This issue will provide you with an opportunity to learn from 100 enterprises judged best in their fields for quality.

The issue begins with Senior Writer Tom Kiely's interview of Dr. Reimann (whose full title is Associate Director of Quality Programs at the National Institute of Standards and Technology of the U.S. Department

INDEX TO QUALITY CATEGORIES

Automotive	p. 42
Banking	p. 46
Computers & Communications	p. 50
Consumer Electronics & Appliances	p. 56
Electronic Devices	p. 62
Health Care	p. 66
Hospitality	p. 70
Pharmaceuticals	p. 76
Transportation	p. 82
Utilities	p. 86

QUALITY: WHAT IS IT?

In enterprises that have attained the highest levels of quality:

- ▶ The maximal satisfaction of customers' needs and expectations is regarded as the ultimate yardstick of quality. Customer needs and expectations may include conformance to requirements (and responsiveness to changing requirements), zero defects, value at reasonable cost, reliability, durability, serviceability and aesthetic appeal.
- ▶ To achieve maximal customer satisfaction, the enterprise's staff obtains and shares pertinent information, continually improves business processes, shortens time cycles, uses resources more efficiently and sets specific, measurable quality goals.
- ▶ The enterprise must have an uncompromising commitment to quality. Management vigorously affirms the importance of quality to employees and consistently provides the training necessary to achieve that quality. Employees take personal responsibility for quality.

Companies do not achieve quality by:

- ▶ making improvements that are not desired by customers and not supported in the marketplace;
- ▶ simply achieving zero defects if the customer demands more than just a defect-free product;
- ▶ simply providing many features in its products—that's functionality;
- ▶ simply providing comfort and aesthetic pleasure—that's luxury.

of Commerce). His office sets the criteria for the Baldrige Award, sends out the examiners who judge the applicants, and chooses the winners. No one in America has a better view of the quality improvement movement. In Reimann's opinion, quality absolutely depends on information. Accordingly, IS plays an important part in meeting each of the seven criteria for winning the Baldrige Award: leadership, information/analysis, planning, human resources, quality assurance, results and customer satisfaction. The interview with Reimann is a wake-up call for IS executives—CIOs, the quality movement needs you.

Our next article profiles one of the first Baldrige Award winners—Milliken & Co., a bastion of excellence in the troubled textile industry. Milliken has reduced the cost of product defects by 60 percent since 1981, and improved its on-time delivery rate from 77 percent to 99 percent since 1985, according to Baldrige examiner W. Kent Sterett, who spoke at a recent conference on quality held by the Conference Board, a New York-based business research firm.

Milliken officials usually turn down interview requests from the press. But the company permitted us to send Senior Writer Meghan O'Leary to its Spartanburg, S.C., headquarters to observe how Milliken's quality improvement process works. The secret of Milliken's success, O'Leary learned, lies in its ability to inspire employees to strive for and achieve quality. The article shows how Milliken practices the art of quality motivation.

This issue also includes a column by Baldrige Award examiner Ron Asbury, director of quality consulting at Texaco Inc., who offers advice for anyone who has thought about hiring a quality-improvement consultant. Managers who are new to the quality movement are easy marks for hucksters and charlatans masquerading as quality experts. Asbury has plenty of firsthand experience hiring and working with consultants at Texaco. In his column, he takes a look at the quality consulting field and sets out some guidelines for finding and working well with bona fide consultants.

As in the past, at the heart of the CIO-100 are the 10 feature articles

MULTIPLE CIO-100 WINNERS

FOUR-TIME CIO-100 WINNERS

(1988, 1989, 1990, 1991)

American Airlines Inc.
Citicorp

THREE-TIME CIO-100 WINNERS

(1989, 1990, 1991)

American President Companies Ltd.
Federal Express Corp.
Johnson & Johnson
Merck & Co. Inc.
Motorola Inc.

DOUBLE WINNERS

(1990 & 1991)

Apple Computer Inc.
Banc One Corp.
Bose Corp.
Compaq Computer Corp.
Cypress Semiconductor Corp.
Digital Equipment Corp.
Glaxo Holdings PLC
Hewlett-Packard Co.
Honda Motor Corp. Ltd.
IBM Corp.
Intel Corp.
Microsoft Corp.
NEC Corp.
Sony Corp.
Texas Instruments
Toshiba Corp.
Walt Disney Co.
Wells Fargo & Co.
Xerox Corp.

about our 100 winners. They include Baldrige winners (Motorola, Xerox, Cadillac, IBM and Federal Express) and past CIO-100 winners (American Airlines, Citicorp, Merck, American President Companies and Johnson & Johnson). We invited our judges to nominate foreign companies, and many made the list. They include such well-known Japanese corporations as Toyota, Honda, Fujitsu, Hitachi, Sony and Toshiba; Canada's Royal Bank and Four Seasons Hotels; the Hong Kong-based Regent International Hotels chain; Britain's Glaxo; and Germany's Mercedes-Benz and Bosch. Some less familiar names also made the list: Nippon-denso, a Japanese automotive parts manufacturer; Grand Trunk Western Railroad of Detroit; HCA West Paces

IT INVESTMENTS

Q: In which technologies are you planning to invest in the near future? *

- Artificial intelligence
- CASE
- Client/server computing
- Cooperative processing
- EDI
- Executive information systems
- Expert systems
- Graphical user interfaces
- Imaging
- Networking

Number of respondents: 64

* Top 10 responses by number of mentions

Q: In which products is your IS organization now making the most significant investments?

- IBM PS/2 (32%)
- Digital VAX (22%)
- Apple Macintosh (14%)
- IBM AS/400 (14%)
- Compaq 386/486 (10%)
- Hewlett-Packard 3000 series 900 (10%)
- Amdahl 5890-300E (6%)
- Hitachi 3390 (6%)
- IBM 3390 DASD (6%)
- IBM ES/9000 (6%)
- Novell LAN Manager (6%)
- Storage Technology auto tape system (6%)
- Sun workstations (6%)
- Tandem VLX (6%)

Number of respondents: 50

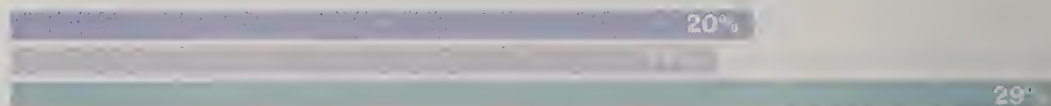
Ferry Hospital, a community hospital in Atlanta; and Au Bon Pain, a Boston-based chain specializing in fast food à la français.

We came up with our list through a two-step process: We first asked a panel of leading quality experts to vote for the 10 industries in which quality is especially important for any company to excel and compete. We then turned to experts in each of those fields and asked them to nomi-

WHERE THE CIO STANDS

WHOM THE CIO REPORTS TO*

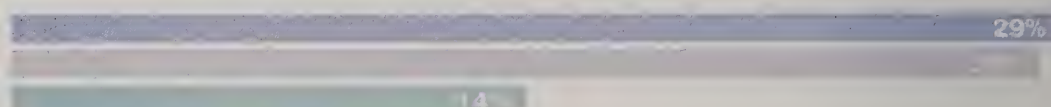
CEO



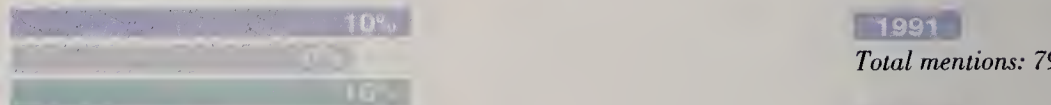
Executive/Senior VP



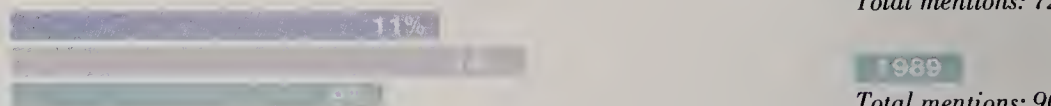
CFO



Division or Group Head



COO



1991
Total mentions: 79

Total mentions: 72

1989
Total mentions: 90

*The 1989 CIO-100 focused on IT excellence; the 1990 CIO-100 focused on the IT-innovation link.

nate the 10 companies that had attained the highest levels of quality in the industry. Each of the 10 feature articles explores the relationship between IT and quality in one industry category. Each article is accompanied by a short profile of a winner in that industry.

To get a true picture of the IT-quality relationship, we did not stack the deck by making IT a basis for selection. We chose judges who were experts on quality and on the nominated industries, rather than on information technology. And we instructed our judges not to consider information systems when selecting nominees. If IT was not especially important for attaining total quality, we wanted to know that.

But Reimann was right: In both manufacturing and service industries, IS matters nearly everywhere quality does. Ninety percent of the companies that responded to our survey of CIO-100 winners said that IS is thoroughly or significantly involved by upper management in their overall quality efforts; 95 percent said that IT plays an "extremely important" or

"important" role overall in achieving total quality.

How does IS contribute to total quality? "Improving customer service" and "increasing knowledge about customers" were two of the most frequently checked-off answers in our survey. Most quality experts we spoke with said that low defect or error rates are not considered sufficient for measuring quality, and our respondents appeared to agree: Relatively few chose "eliminating and preventing defects" as a significant IS contribution to quality. Ultimately, quality is to customers what beauty is to beholders—a perception based on subjective virtues. Customers define quality.

Many CIO-100 winners have a knack for using IT to ingratiate themselves with customers. Consider the Stouffer Hotels chain's reservation system. The system not only tracks the room preferences of its regular customers, but it provides reservation clerks with answers to almost any question a customer might ask about any hotel in the U.S. part of the chain—from health club ameni-

THE IT/QUALITY LINK

THE IMPORTANCE OF IT

Q: In your company, how important a role overall does IT play in achieving total quality?

- **Extremely important** (56%)
- **Important** (39%)
- **Somewhat important** (5%)
- **Not important** (0%)

Number of respondents: 73

IT CONTRIBUTIONS

Q: In which ways does IT play a role in achieving total quality?

- **Improving customer service** (97%)
- **Improving business processes** (96%)
- **Increasing knowledge about customers** (78%)
- **Monitoring/measuring customer satisfaction** (75%)
- **Evaluating continuous improvement efforts** (73%)
- **Creating and/or improving partnerships with suppliers** (71%)
- **Providing training to employees** (69%)
- **Empowering employees** (63%)
- **Shortening time cycles/reducing product lead times** (60%)
- **Monitoring customer expectations** (53%)
- **Eliminating and preventing defects** (48%)
- **Improving manufacturing capabilities** (48%)
- **Other** (18%)

Number of respondents: 73

ties to directions to the airport. "I keep track of how often our agents have to say, 'I'm sorry, I don't know,'" said Stouffer MIS Director Debra Kristopson.

Keeping track of such details is an important way IT improves quality. Quality-minded organizations also have a passion for measurement. Miliken's headquarters, for example, is plastered with measures of improvements in attendance, cost cutting, backlog reductions and the like. Even the corporate health club lists how

CIO CONTRIBUTIONS

Q: What do you expect to do as CIO to help your company achieve quality?

- **Benchmark or otherwise measure quality performance** (25%)
- **Provide accurate, consistent and timely information** (16%)
- **Support customer service** (16%)
- **Incorporate principles of TQM into IS activities** (13%)
- **Re-engineer business processes** (13%)
- **Empower employees** (10%)
- **Provide enterprisewide computer-based communications** (10%)
- **Assist in developing a corporate total quality plan** (9%)
- **Integrate IS with key strategic areas of company** (9%)
- **Improve efficiency of operations** (7%)
- **Improve productivity** (7%)
- **Investigate and pursue technology that meets the objectives of company** (7%)

Number of respondents: 69

many people have joined up and how many pounds they've lost.

Most of this year's winners said that IT also contributed to total quality by "improving business processes." For example, EDI, real-time cargo tracking and the ability to deliver parts in correct assembly sequence have made Grand Trunk Western Railroad popular with automakers. The same is true in health care. One of the most highly regarded hospital chains in the United States, Salt Lake City-based Intermountain Health Care, has developed a quality-boosting clinical system; it instantaneously enters data into patient records from bedside terminals and laboratory instruments, and uses an expert system to advise care givers on how to treat patients.

These examples illustrate only some of the ways IT contributes to total quality. We invite our readers to examine IT's quality connection for themselves, and hope this year's CIO-100 package will make for rewarding reading. —Allan E. Alter

MAKING A LIST

Quantifiable, statistical measurements work well for individual companies that are attempting to gauge the quality of their goods or services. But only a foolhardy editor would claim the existence of a set of yardsticks for rating quality across industries. Quality means different things in every industry. So, as in the past two years, we relied on outside experts to pick our CIO-100 winners.

We began by asking experts on total quality to provide a definition of quality, aspects of which we incorporated into our own definition (see box). We then asked these and other quality experts to name the 10 industries or nonprofit sectors in which they felt quality is especially important to achieving competitive advantage or fulfilling the organizational mission. We next sought out experts in each industry—consultants, professors, trade journal editors, Baldrige Award judges, Wall Street analysts and trade association officials—to name the 10 enterprises they considered to have the highest standards of quality in their areas of specialty. The CIO-100 winners are those companies with the greatest number of votes. The competition was open to small or foreign enterprises, as well as large domestic ones.

Some of the industries we selected are amalgams of several industries named by our panelists. For example, the health care category includes community hospitals, large teaching institutions and an HMO.

Inevitably, there are deserving companies that did not make the CIO-100. We are confident, however, that the organizations included have attained the highest level of quality.



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“Q” TIPS

For CIOs, the Total Quality Management Era could prove to be both the best and the worst of times. That is the opinion of Curt Reimann, and it would be difficult to find a better-informed opinion about organizational quality than his. Reimann is director of the Malcolm Baldrige National Quality Award program and director for quality programs at the National Institute of Standards and Technology (NIST, formerly the National Bureau of Standards). Over the last

**Quality connoisseur
Curt Reimann**

**expects companies
that undergo the
Baldrige process
to emerge with a
knowledge of their
shortcomings and a
renewed dedication
to excellence. CIOs
whose organizations
accept his challenge
are in for the work-
out of their careers.**

four years, Reimann has managed a legion of examiners who have studied, often in close detail, the quality efforts of hundreds of U.S. companies.

The corporate pledge to quality will herald the worst of times for a CIO because making good on that promise will test the IS department's mettle. Organizational quality cannot be achieved without comprehensive information systems. In effect, information is the air that quality breathes—and business systems that are merely better than average may not be good enough. Reimann predicts that as CIOs dig into the Baldrige Award criteria they may be “shocked to see all the [TQM] trails that lead to their doors.”

When the shock wears off, though, the CIO

BY THOMAS KIELY

PHOTOGRAPH BY WALTER CALAHAN

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might also see opportunity in the challenge. After all, if quality programs are dependent upon good information systems, the CIO could play an integral—and highly visible—role in shaping the quality-dyed corporation.

Still, the TQM Era hasn't dawned yet, despite a decade of hoopla about quality and competitiveness. Skeptics contend that quality is just another passing business fad. But quality boosters hope otherwise, and they see the Baldrige Award as a catalyst for change. (Established by an act of Congress in 1987, the Malcolm Baldrige National Quality Award honors companies that excel in quality.) And they can find encouragement in the numbers reported out of Reimann's office. In the first year of the award program, NIST distributed 12,000 copies of the application and 60 companies eventually competed. In 1991—the fourth year of the program—106 companies are vying for the Baldrige laurels, and Reimann's staff estimates that they will distribute more than 250,000 copies of this year's application guidelines.

Up to two awards a year may be won in each of three categories: manufacturing, service and small business. The Baldrige is not an Academy Award for quality, however; it is not bestowed upon the best annual performer in each category. (To date, Reimann's program has handed out only nine out of a possible 18 awards. Rather, the award is a cynosure. As Reimann explained, the Baldrige Award "should mean something, and one of the ways to have it mean something is by being sure that all of the recipients of the award meet a high standard."

All quality standards are ultimately defined by King Customer, but the Baldrige Award is concerned specifically with a corporation's mechanisms for delivering quality value to the customer. Consequently, Baldrige examiners appraise quality not by evaluating products but by taking a long hard look at a company's quality gauges and thermometers and spectrometers.

For example, when Baldrige exam-

iners score competitors' efforts in the area of customer service—considered the most important criterion in the evaluation process—they don't survey customers. Instead the examiners inspect the systems companies have in place to determine customer requirements and expectations, how companies manage customer rela-

Many companies don't yet understand what a total quality system involves.

Their systems may be functionally good, but they are incomplete—often lacking important applications for customers or employees, or having too few benchmarks.

tions, and how they define and measure service standards. More specifically, examiners want to know how companies make use of what Reimann called "customer listening posts, like complaints, comments, customer attrition or turnover." Does the company have in place a system to examine how customer complaints and comments are handled? Does it track and understand the factors behind orders won and lost? Does it analyze its competitors' customers? Baldrige winners, said Reimann, "are companies that are looking at all of these [factors] and are either currently excellent at them or are rapidly developing [toward excellence]."

In another criterion, quality results, Baldrige examiners scrutinize satisfaction from a point slightly upstream of the customer. That is, they observe how companies internally calibrate their relationship with the customer. How does the company gauge its reliability, accuracy and performance? Is there a system in

place to measure after-sales services? How does the company capture and analyze information on defect rates, cycle times, use of materials, energy and capital? Also, how does the company track the results of these measures against competitors—and just how objective is all this information?

Management "by fact" is a quality rule of the road. So when Baldrige examiners evaluate a company's management information systems, the key measures are the breadth and depth of data used to support its quality efforts. What applications do companies use to collect and disseminate information on customers, employees, suppliers and competitors? How about information on health, safety and regulatory compliance? Business processes, objectives and benchmarks? How are the numerous threads of information from throughout the company pulled together for use in planning and operations? How rapid is the access to information? What steps does the company take to ensure the reliability and consistency of the information? How timely is it?

"Information systems is a major theme of the Baldrige Award," Reimann said. "Quality-conscious companies are more data-rich [than other companies]." Baldrige Award winners, and several near winners, have developed sophisticated information systems to constantly probe all of their operations, processes, products and services, and they continuously analyze the data to ascertain where they stand in the quality journey—an analysis measured against where they once were and where they hope to go. "They can't do that by guessing," Reimann said. "The two [information and quality] go together hand in hand."

Moreover, how does the IS department continuously improve the information collected from, and used throughout, the company? "The information system itself should be subject to the continuous improvement models and objectives," Reimann explained. "Information is not

an end to itself: It exists to serve. But how well is it serving? How do I know if it's any good? And how will I know a year from now if it's better?"

In function-haunted companies, Reimann said, IS staffers "may have the feeling that we were installed, and we weren't expected to get any better." (Employees in other functions may feel this way, too.) "But since IS systems cover the whole organization and put the tools in the hands of management to make assessments of where we stand, that makes it a critical function. [IS] must not be a barrier, but a strong contributor to enhancing the capabilities of the whole organization."

Very often, companies competing for the award are chagrined to discover that their prized information systems don't measure up to the high Baldrige standards. (The Baldrige

criteria—see list, Page 32—evolved out of the experiences of top quality companies.) Reimann put it more tactfully, noting that many companies don't yet understand what a total quality system involves. "[Once] they get inside of the Baldrige criteria, they realize that this requires a very directed look at information systems, and at problem-solving, and at real-time rapid support for all operations in the company," he said. Their systems may be functionally good, Reimann explained, but they are incomplete—often lacking important applications for customers or employees, or having too few benchmarks.

The emphasis on benchmarks reveals a key assumption that underlies the Baldrige Award criteria: Quality analysis is often comparative analysis. Knowing where you are on the quality journey means knowing where

you have come from and where you are going. Benchmarking, said Reimann, "also requires companies to ask the question: 'Which are the best organizations in performing this function or making this product, and how are they doing it?' It encourages quantitative comparisons."

Baldrige winners benchmark themselves against top performers outside their own industries. Xerox Corp., for example, compares its daily production processes against those at Cummins Engine, and its distribution efforts against the accomplishments of L.L. Bean. "Benchmarking is something a lot of companies don't do," Reimann said. "But it's a big potential driver for improvement."

Two other categories—strategic quality planning and human resource utilization—also involve information services. Employee information sys-

Everybody's a Winner

Many compete, but few are chosen. Still, some companies say the real prize is the lessons they learned from participating.

Baldrige Award winners receive a fancy gold and crystal trophy and lots of great press. But some near winners say that the real prize is in the process, and that participating is almost as good as winning. "We'd have loved to win," said Harry Kavetas, IBM vice president and president of IBM Credit Corp., in Stamford, Conn. (Kavetas' company ran in 1990, but lost to Federal Express.) "But we are a far better company for having competed."

Corning Inc. feels that way, too. Corning's telecommunications division competed for a Baldrige Award in 1989 and finished among the top contenders—but not among the winners. "We did win," asserted Michael H. McDonald, manager of quality for Corning's opto-electron-

ics group, in Corning, N.Y., of which the telecommunications division is a part. "We won because [competing] allowed us to assess ourselves, and that led to some critical internal improvements."

The Baldrige criteria proved to be an exacting quality template for both companies. Kavetas cited the "discipline" of the process; McDonald noted that the criteria "provided rigor" to Corning's quality efforts by clearly spelling out many of the issues the company needed to address. The Corning division assembled interdisciplinary teams to study the company's processes in fine detail, leading to changes in the way the company handled business routines, monitored suppliers and involved customers in the product cycle. IBM Credit, meanwhile, in-

corporated the Baldrige challenge into its ongoing efforts to provide high-quality service.

Neither won the laurels. Both companies' benchmarking systems fell short. While Corning was not up to snuff in its business process management, IBM Credit wasn't doing enough to monitor its suppliers' quality efforts or to involve employees in its own efforts.

Since then, both have been trying to improve. IBM Credit may compete again, though not this year. But McDonald isn't sure Corning's telecommunications division ever will. "Winning the Baldrige isn't our goal," McDonald said. "Our goal is to become world class. And world class is between the ears of the customer."

—T. Kiely

The Baldrige Heptathlon

Competitors in the quality Olympics are judged by seven criteria

Curt Reimann manages the Malcolm Baldrige National Quality Award program out of the National Institute of Standards and Technology, a house of measures. Before he was asked to run the Baldrige program, he was deputy director of the National Measurement Laboratory, and developed a personal and professional interest in issues of national quality standards—a subject that today ranks high on corporate agendas.

Most of the Baldrige examiners come from the private sector, and a public-private foundation helps underwrite the program. Organizational evaluations are based on seven quality criteria:

► **Leadership:** How do senior executives instill quality values in the organization, and how does the company mesh its public responsibilities with quality values?

► **Information and analysis:** What is the scope and accuracy of the information used to drive quality?

► **Strategic quality planning:** What is the company's planning process for achieving and sustaining quality, and how is it integrated with overall business planning?

► **Human resource utilization:** How does the company develop the full potential of the workforce?

► **Quality assurance of products and services:** What systematic approaches does the company use to assure quality?

► **Quality results:** What objective measures are used to measure quality and continuous improvement?

► **Customer satisfaction:** How thorough is the company's knowledge of the customer?

tems at top-quality companies will include data on employee involvement, safety, health, absenteeism, turnover, training programs and the like. "It's a measure of the involvement—and the effectiveness of the involvement—that are indicators of buy-in," Reimann said. (Employee empowerment and teamwork are important subthemes in the Baldrige program.) "They are systems that give companies real clues as to the effectiveness of their ability to promote change."

As for strategic planning, the quality plan and overall business planning are "tightly coupled" in quality companies, Reimann said. "It's not that quality planning is a separate thing done off to the side." And information systems help make that coupling work.

The first category Baldrige examiners look at, however, is leadership. A customer-minded total quality management program "doesn't just break out spontaneously," Reimann noted. "It requires visionary, forceful, patient leaders, who are able to bring others on board."

It does not require a CIO, however, any more than it requires advanced data architectures, electronic data interchange or an executive information system. "No such requirements are part of the Baldrige criteria," Reimann pointed out. Baldrige juries do not score competitors against a fixed catalog of quality traits. The Baldrige criteria are intended as a framework for quality, but how each company solves the numerous problems it faces within that

framework is open. One of the intents of the Baldrige Award is to spark competitors to discover creative solutions to quality problems.

"Information [management] is central to quality systems," Reimann said. "For some companies, an information leader is crucial. For other companies, having that responsibility as part of your other responsibilities is the way to do it."

However configured, the information manager will have a unique role in the quality process. He or she must "have a good understanding of the quality system, a full set of [quality] criteria and the information implications of the requirements in all the categories," Reimann said. Thus, information managers must "have much greater knowledge about all the other functions of the company than [they] ever had before. They [must] have enough knowledge of the techniques of quality to be able to fashion an improvement scheme for their own function. And they have to see themselves as servants to the whole company. They have to have a powerful customer orientation to so many functions in the company."

That's a tall order—if it ever comes to that. Many companies are pursuing quality, but often not at the level demanded by the Baldrige program standards. (On the other hand, Reimann said, the Baldrige competition "isn't intended to be an afternoon in the park for anyone who has sneakers; it is meant to be a contest among the well-prepared.") Also, there is some question as to how seriously some companies practice their professed faith in quality.

Reimann acknowledges the problem, and restates it through the terms of his program. "If all we're doing is patting on the head the few who have made a superior commitment, then I think we will not have accomplished much," he said. "The question is, will thousands of organizations [pledge to quality]? Unless thousands of organizations do it, we're not going to see it in any national bottom line."

He's not Pollyanna, but he's optimistic. ☐

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THE FABRIC OF QUALITY

**Like the textiles it makes,
Milliken & Co.'s Baldrige Award-winning
efforts in quality have been
patterned and woven into every
aspect of company life**

BY MEGHAN O'LEARY

The decor of the Roger Milliken Research and Customer Center in Spartanburg, S.C., speaks volumes about the pursuit of quality at Milliken & Co., a 1989 winner of the Malcolm Baldrige National Quality Award. Much of the wall space in public areas is covered with samples of the beautifully colored and textured rugs that are some of the company's best-known products. The rest of the walls are devoted to the textile manufacturer's visual report card—the graphs by which it broadcasts corporate performance goals and incremental improvements in areas ranging from employee attendance and morale to the cost of fixing mistakes; the photographs and plaques acknowledging exceptional departmental performance; and portraits of employees who have introduced innovations into the company. The work areas of the center are similarly decorated with rugs, pictures, awards, graphs and more graphs. These pieces are no mere adornments, but dynamic measures of the company's commitment to an ongoing quality process based on educating, involving and recognizing employees for performance improvements.

Quality, as any Millikener will tell you, is not so much an end goal as a never-ending process. Milliken's challenge is to invest employees with the drive and responsibility for continuous improvement in a very low-paid industry with very high turnover. Milliken's quality process relies on five critical components: a passion for quality, cultural change, involvement of everyone, effusive recognition of employee contributions, and customer satisfaction. A private company, Milliken is traditionally—and understandably—cagey about revealing specific technology and process improvements. But, as Milliken officials are fond of pointing out, quality lives and dies by the "soft" issues: human concerns such as morale, emotional investment, empowerment, education and pats on the back. The line in Milliken's "Pursuit of Excellence" quality seminars is that "the hard stuff is easy and the soft stuff is hard."

The soft stuff is hard primarily because nurturing the worker's emotional investment in the business is a foreign and unspeakably fluffy concept to many companies. In 1979 Milliken was the leading textile manufacturer in the country. Its state-of-the-art equipment allowed it to provide the highest-quality product and the best productivity. Nevertheless, Milliken discovered that year that Japa-



MILLIKEN & CO: CORPORATE PROFILE

Milliken & Co., which has its headquarters in Spartanburg, S.C., employs over 14,000 associates in Spartanburg and at 47 manufacturing sites and several sales offices located around the country. Milliken's 28 businesses produce more than 48,000 different textile and chemical products ranging from apparel fabrics and automotive fabrics to specialty chemicals and floor coverings. Milliken & Co. serves over 8,500 customers worldwide and makes over \$1 billion in sales annually. The privately held company has had only three CEOs in its 126-year history. Milliken declines to re-

lease financial information.

Heading up the company is the Policy Committee, consisting of Roger Milliken, the CEO and chairman; Tom Malone, the COO and president; the vice president of management development; the vice president of finance; the vice president of quality, and four division vice presidents who oversee four divisional Pursuit of Excellence directors. The policy committee spends four hours of its monthly meeting week discussing quality. Business managers meet two days a month with Roger Milliken to discuss their quality performance.

Executives (l. to r.) GREG EASTERLIN, NEWT HARDIE and JOHN GIESER have moved out of their offices and onto the floor as part of Milliken's effort to open lines of communication. Milliken also helped level the field of play by delegating more authority to employees, like these textile factory workers (opposite page).

PHOTO BY WILL MCINTYRE



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The first step in opening the lines of communication between managers and staff was to level the field of play. There are no executive washrooms, closed offices or executive parking spaces.

nese manufacturers were providing better quality, better service and higher productivity with older equipment. The secret, if one were to believe the Japanese example, was to put responsibility for quality in the hands of the workers. In 1980, CEO and Chairman Roger Milliken read Phil Crosby's book *Quality Is Free* while on a ski trip to Colorado. He returned to the office ready to test Crosby's premise that quality must be nurtured from the bottom up.

Investing employees in quality improvements, problem solving and customer service promised to be a challenge for Milliken. A dozen decades of bureaucracy and messenger shooting had left a fractured, hierarchical corporate culture in which executives were known as "Mr." and production workers were known as "hands."

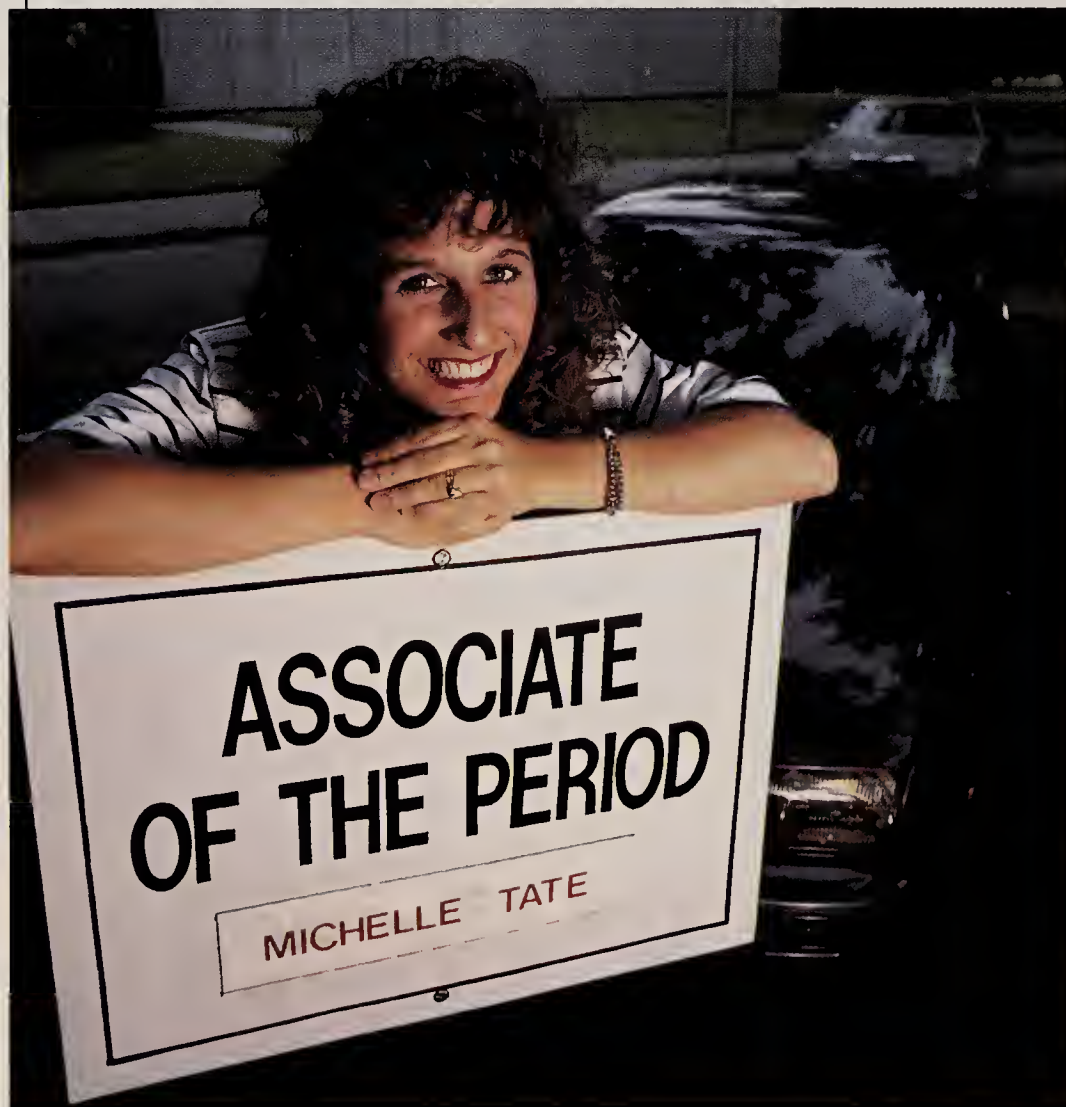
The company's relationships with customers and suppliers were largely adversarial. Large customers got preferential treatment. Small customers got whatever service was left when the large customers were done.

Milliken's first year in pursuit of quality was a failure, by most accounts. While one business division made progress in productivity, the other three got worse. Employees were not committed to the process and mid-

dle management resisted any loss of control. The opportunities for employee input had deteriorated into paranoia-causing error-detection exercises, and suggestions were punished as often as they were rewarded. "People didn't trust us in the beginning," admitted Greg Easterlin, vice president of quality. "We started forming these [error-recognition] teams and these Quality Improvement Teams," he said. But when managers asked employees for their input they were reminded of the response such suggestions had met with in the past: "'Go away, I got better things to do. Thank you for your idea but get back to what you were doing. We're losing a few units here while you're trying to tell me this good thing.'"

It took time to develop the trust necessary for employee involvement in the quality process to unfold, and for production workers to realize that management was sincerely interested in responding to their suggestions.

The first step in opening the lines of communication between managers and staff was to level the field of play. In 1982, Tom Malone, then a department head and now president of the company, moved out of his office onto the open floor with his staff. His department experienced immediate communication and performance improvements. Gradually the rest of the managers also moved out, although Milliken issued no mandate. The last manager moved out into the open in 1987, which, according to Newt Hardie, former vice president of quality and current deputy vice president of financial planning, "gives you a feel for how long it takes some people to



Recognition and teamwork are key ingredients in Milliken's quality recipe. **MICHELLE TATE** (left) receives special parking privileges and other rewards for being named a Milliken Quality Associate. At factories, self-led production teams (above) demonstrate improved productivity and morale.

catch on." Today, there are no closed offices at Milliken.

Milliken eliminated such hierarchy-reinforcing institutions as profit-based bonuses, executive parking spaces and executives-only washrooms. Staff members address each other by first name. (Roger Milliken is the exception to this rule: Milliken employees refer to him respectfully and unfailingly as "Mr. Milliken." Milliken also has an office.)

Milliken also began a campaign to reform the corporate lexicon: All workers are now referred to as "associates." "Management" and "manage" also posed problems since they implied a lack of direct involvement in the process. While "managers" still exist, Milliken prefers to call them "leaders" and "coaches."

Those terms convey the importance of teamwork to the empowerment process. Production teams at factories are self-led and cross-trained, with the authority to set their own deadlines, monitor productivity levels and make the decisions necessary to solve problems. Associates, including team leaders, trade duties every few days or hours, depending on the job. The teams' excellent performance indicates that the empowerment approach boosts morale as well.

With an increase in authority come new responsibilities. Milliken employees are more active participants in the company's pursuit of quality, but they can also be held accountable when they stumble in that pursuit. For example, in 1985, Milliken's internal measures of its performance record differed markedly from its customers' perception. At that time, Milliken measured on-time delivery performance by when an order was shipped rather than when it was delivered. Although most shipments were made punctually, only 75 percent actually reached customers on time. Today, any business manager whose shipments are late more than 2 percent of the time must come to a policy committee meeting to explain why, and say what he or she is going to do about it.

None of Milliken's plants is unionized, and the company has a turnover rate for its production personnel that is slightly better than the industry average. "We were so guilty" of devaluing employees, said Easterlin. "We wanted our workforce to come in and check their brains at the door, because *we* were smart. *We* knew what to do."

No More Loose Threads

One challenge of a companywide push for quality is bringing independent-minded IS staff into the team effort

Team-centered quality processes and solitary MIS people, while not necessarily natural enemies, can take some time getting used to each other. Like most IS departments, Milliken's technical group is bent on better understanding the company's business teams and how to support them; one way to facilitate this was hiring people who could communicate well. "We used to be content to have a real [technical] whiz who could work alone," said Jesse Johnston, director of corporate systems. "Now no one works alone here."

The quality-team process didn't fit traditional programming the way it fits more interaction-intensive jobs. IS staff resistance was caused less by stubbornness, said Johnston, than by pride in and the habit of doing independent work. IS experienced some false starts with its central Quality Improvement Team (QIT), which was initially composed entirely of departmental managers. "It was tough to get it going," Johnston admitted. The leaders, while essential to the quality process, couldn't make it work without the support of their associates. Today the IS QIT is made up primarily of administrative associates and only one leader. In Johnston's view, the team has a much better understanding of the day-to-day problems it must address.

From its communication with other workgroups, Milliken's IS department has begun to focus on the "Walk Up and Use" approach to computer training. "One of our objectives is to do away with instruction manuals," Johnston said. The department also emphasizes good telephone skills and prompt response to support calls.

The business of supporting the business has changed dramatically in the last 10 years, according to Johnston. IS used to spend a long time developing systems that wouldn't have to be changed for a long time. Today, however, systems development is geared toward supporting internal customers' time-sensitive product development. Not only must IS build a system faster, but "we don't have a lot of time to debug it, as we did 10 years ago," Johnston said. "It needs to work when we install it."

In addition, IS has had to throw out such irrelevant performance measurements as the number of lines of bug-free code and start using such manufacturing-oriented measurements as the cost of nonconformance—what it costs the company to make up for system delays and failures.

MIS's efforts have not gone unnoticed. The department has received an internal Baldrige Award, as well as a Wingman Award (see main story).

—M. O'Leary

Today self-led teams solve problems across the company. Quality Improvement Teams drive each department's quality processes. Corrective Action Teams are designed to systematically resolve problems (or "opportunities," as problems are referred to at Milliken) identified by associates companywide. Customer Action Teams work to support Milliken's customers' manufacturing and ordering processes. Supplier Action Teams work with Milliken-certified suppliers to reduce the number of supply sources, get good prices and performance, and introduce suppliers to electronic data in-

terchange and bar coding. Certified suppliers must have their own quality management processes, use statistical process control and have a commitment to product quality and customer service.

Milliken believes in educating associates to enable them to work effectively in teams. For this reason, the company invests heavily in education—about \$1,300 per associate in 1989. Milliken associates receive cross-training in the plants and can take free high school equivalency courses on-site after work hours. Managers cross-train by changing positions and departments frequently.

Milliken trains its employees in quality at 3-year-old Milliken University, a 65,000-square-foot center replete with computers and Harvard Business School-style tiered classrooms. Administrative associates are encouraged to undergo 20 to 40 hours of quality training a year, while 40 hours are required of leadership associates. All managers must also complete Dale Carnegie courses in communication and public speaking, and Milliken offers tuition reimbursement for job-related courses taken outside the company.

Milliken's Yardsticks

The company consults a diverse patchwork of manufacturing peers to measure its progress toward excellence

"Steal shamelessly or borrow honorably." Newt Hardie, Milliken's former vice president of quality, now deputy vice president of financial planning, doesn't care how associates phrase it, as long as they do it—use other people's good ideas, that is.

"We're open to learning from anybody in an effort to [improve] our process," agreed one Milliken official. Just as Japanese manufacturers were the catalyst for Milliken's quality program, so the company still learns from its peers, looking to other manufacturers for benchmarks in nearly two dozen operational categories.

"You can't be world-class if you stay home," Hardie says. With this in mind, the company stopped comparing itself with averages and started benchmarking its important functions to the best performers of those functions in the world. Although Milliken does not allow other companies to benchmark its own processes, it has persuaded a long list of firms to let Milliken associates visit and learn. Milliken has gone to Du Pont for tips on safety and security; AT&T and IBM for customer satisfaction; 3M for innovation; IBM and Motorola for employee education; Frito-Lay, IBM and AT&T for strategic planning; and Japanese manufacturers, U.S. shoe companies and Lenscrafters for time-based competition.

For quality processes, the company looks to Motorola and Westinghouse; for benchmarking, to Xerox; for self-managed teams, to Goodyear and Procter & Gamble; for continuous improvement, to the Japanese; for heroic goals and statistical methods, to Motorola; for flowcharting, to Sara Lee; for supplier evaluation, to Du Pont, Monsanto, Ford and GM; for accounts payable, to Mobay; and for order-handling, to L.L. Bean.

—M. O'Leary

Education in quality is just one method of keeping employees engaged in the process. A key measure of employee involvement is a suggestion program known as Opportunities for Improvement (OFI). OFIs are really much more than suggestions. They are Milliken's attempt to keep everyone involved in continuous improvement, to keep them thinking about quality. Every employee is encouraged and expected to participate in OFIs, and departments get awards for 100 percent participation. OFIs have had phenomenal success at Milliken, which has a company-wide goal of 50 OFIs per associate per year. OFIs can be minor changes or innovations. Employees don't necessarily have to have the solution to a problem. They merely need to point out an area for potential improvement. (The areas of wages and office decor are understandably exempt from the program.)

By encouraging associate input, Milliken encourages recognition of their contributions. Although a critical part of Milliken's quality process, recognition got little emphasis until mid-1985, according to former CIO John Gieser. "We've got some smart people," he said. "We just had to realize that they were smart and give them that recognition."

Recognition comes in many forms at Milliken: certificates, T-shirts, or even a reserved monthly parking space close to the front door for associates chosen by their peers for their contributions to quality. Milliken associates have a boundless enthusiasm for quality, and part of that stems from the fact that recognition of their contributions is often fun. A Milliken institution known as a sharing rally lets associates come together to share and celebrate their quality success stories. Roger Milliken once said that the single biggest failure of his business career was the inability to take a good idea from



Education is a critical component of Milliken's quality quest. GREG EASTERLIN instructs a class at the company's research center.

one plant and apply it at another. Through sharing rallies, the company discovered that fellow employees are often better communicators and motivators than management.

"The more fun you make it," said Hardie, "the more effective it is." Hardie himself goes all out to make quality fun: At a recent Pursuit of Excellence Seminar, he appeared (briefly) in a cheerleader's outfit and blond wig in order to muster enthusiasm for Quality Teams.

To further underline its emphasis on quality, the company has eliminated performance- and profit-linked bonuses. Roger Milliken, who believes that bonus systems lead to short-term decision-making, wants to remove any such barriers to thinking for the long term. The same philosophy applies to salespeople, who are well paid by industry standards and are active in the product plan-

ning process, but get no commissions. On production lines the company has eliminated piecework, which it has determined runs counter to quality and teamwork because of its emphasis on volume alone. As per the American dream, at Milliken the best performers get promoted to a higher pay level quickly. (There are only three pay scales at the company.)

Milliken has replaced traditional forms of compensation with awards: the Gazelle Award for quick response to customer needs; the Top Gun Award for production units that contribute most to profitability; and the Wingman Award for support groups that have had the greatest impact on profits. In addition, an internal award modeled after the Baldrige stimulates competition among divisions.

Milliken's emphasis on awards and recognition stems from its theory that if you're not keeping score, you're only practicing. Milliken measures and posts everything, from the size of the IS backlog to the number of associates who belong to the corporate fitness center. The publicizing of incremental progress helps to commit employees to small changes that, taken together, can make big differences.

Such measurement encourages competition among departments that ultimately benefits the company, according to Gieser. "When you're standing in front of Mr. Milliken and you're measuring the cost of defects, you don't ever want to be the [lowest] person on the totem pole," he said.

The result of Milliken's quality efforts has been an ability to focus more on getting close to and meeting the needs of the customer through employee involvement and customer surveys. In addition, information technologies such as electronic data interchange and quick-response systems allow the company to provide indispensable technical support for its customers' and suppliers' business processes, from billing to manufacturing.

Milliken knows that, in the long run, the customer's perception is the only measure that makes any difference. "Anybody can weave a product with an air-jet loom because everybody is buying air-jet looms," Gieser said. "Now it's a question of what do you have that somebody else doesn't have—quality of response, quality of delivery, how you service the customer. It's not just the quality of the product; it's the quality of what you deliver to the customer." ☐

Milliken's
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AUTOMOTIVE

FINE MOTOR SKILLS

In the auto industry, quality means assembling many thousands of precision parts in a defect-free package; it can also mean sending technicians into the field to observe how shoppers load groceries into their cars

One of the most complex manufacturing tasks of the modern world is to build a safe, reliable, stylish, powerful, fuel-efficient, road-hugging, roomy, reasonably priced, one- or two-ton machine out of about 10,000 different parts made by hundreds of different suppliers.

No wonder only a few dozen companies worldwide attempt to mass-produce automobiles and trucks for the global marketplace. At the end of the assembly line wait customers with \$6,000 to \$60,000 of mostly borrowed money in their hands. They are in no mood to accept anything less than total quality.

To meet the requirements of today's demanding customers, the auto industry has moved from Little Q to Big Q issues. "The focus is changing," explained John Aalbregtse, associate partner in Andersen Consulting's Detroit office, "from statistical tools, number of defects and process improvement"—Little Q—to the larger matter of restructuring total operations in order to

deliver what the customer defines as a quality product.

Japanese manufacturers, notably Toyota Motor Corp. and Honda Motor Co., set the standard for quality in the 1980s. They have routinely topped the annual J.D. Power customer satisfaction survey by building what analysts refer to as "bulletproof" cars—vehicles that simply don't break down.

Toyota and Honda have taken similar tacks to attaining the image of quality they enjoy in the minds of consumers as well as judges. Both get their new car ideas on the road in about 3½ years, two years faster than American companies. This means that the Japanese can more quickly satisfy changing customer tastes.

Honda attains speed to market by forging teamwork out of seemingly sequential functions.

HONOR ROLL

**Buick Motor Division/
General Motors Corp.**

**Cadillac Motor Car
Division/General Motors
Corp.**

**Delco Products
Division/General Motors
Corp.**

Honda Motor Corp. Ltd.

Mercedes-Benz

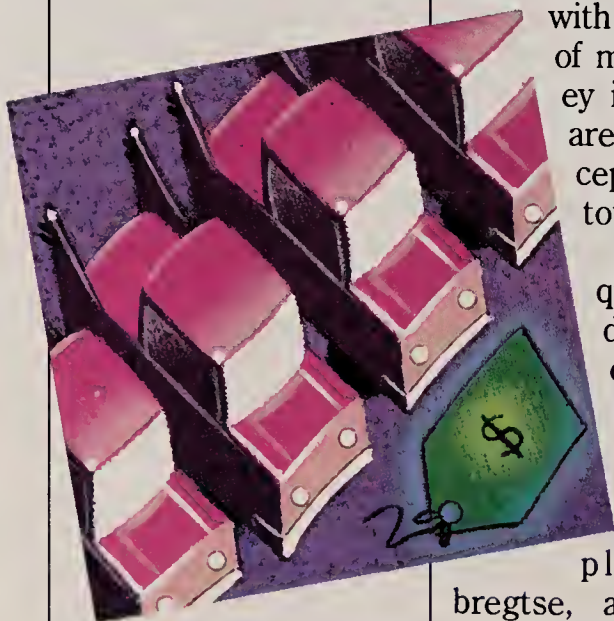
Motorola Inc.

Nippondenso Co. Ltd.

Robert Bosch Corp.

Toyota Motor Corp.

**TRW Inc. Steering &
Suspension Division**



BY GEORGE HARRAR

Back in the Pink

Production of dies (the metal forms that stamp out body parts, such as doors) begins at the same time as body design. This simultaneous design and production requires enormous coordination among workgroups. Toyota achieves speed by creating a huge network of suppliers, from which it gains flexibility as well as expertise. Yet, paradoxically, the company buys from hundreds fewer suppliers than the typical American manufacturer. Toyota cultivates close long-term relationships with selected suppliers; it also tends to buy whole items rather than purchasing components from many suppliers and assembling those items itself.

Honda saw that it could further its high-performance image by building powerful engines for Formula One racing cars. At the other end of the spectrum, the company sends technicians into parking lots to watch people do everyday things, such as load groceries into their cars. Such obsession with details, whether regarding technology design or customer needs, is a large part of Honda's and Toyota's quality programs.

The Big Three U.S. automakers realized that quality was the route to profits and tried to catch up with the Japanese during the 1980s. Some observers no longer see sizable differences in quality between American-made cars and those produced in Japan, at least on one Little Q measure. "No one has a mass advantage anymore," said Jim Harbour, head of Harbour & Associates Inc., a manufacturing management consulting firm in Troy, Mich. "The Big Three had about 750 to 820 defects per hundred cars in the early 1980s; now they're running 150 to 170. Japanese vehicles can range from 120 to 200.

"All the manufacturers," continued Harbour, "are going out of their way to treat their customers like gods."

The gods, then, are smiling on Buick Motor Division, whose Le Sabre has been voted by automobile owners as the top domestic make on J.D. Power's Initial Quality Survey for two years running. Of all makes surveyed, only Lexus, Mercedes-Benz, Toyota and Infiniti scored higher.

In the annals of auto manufacturing, Cadillac Motor Car Division's assembly center at Hamtramck, Mich., was long associated with the phrase "technology run amok." Many millions of dollars worth of robots, computers and communications systems filled the 77-acre main complex in Detroit at its opening in 1985. Cadillac and General Motors Corp. management expressed optimism that the "Robogates" and "Perceptrons" of Hamtramck would result in superior manufacturing.

Soon, however, ominous reports emerged from the plant. Robotic arms spray-painted everything but the car. Computer-monitoring devices generated so much data that no one could sift out the useful information. Rather than being more productive, workers were initially able to build a low 15 cars per hour. In fact, the assembly line often didn't move at all.

Five years later, Cadillac received the Malcolm Baldrige National Quality

Award. How the luxury carmaker turned Hamtramck from an object of derision into an object of respect is a blueprint for achieving quality.

"What happened first was a change in philosophy," said Don Nichols, the division manager for Electronic Data Systems, a subsidiary of GM that provides IS for all its divisions. Cadillac realized it needed to transform itself in three areas: internal culture, external focus on customers, and planning/execution.



DON NICHOLS: A "change in philosophy" about technology helped Cadillac regain its quality reputation.

Specifically, Cadillac began simultaneous engineering through the use of cross-functional, labor-management teams; integrated IT into the overall technology base; expanded contacts with customers, making sure the improved processes were building marketable cars; sought dealer input at the design stage; reduced car development time by one year; and instituted new reward/recognition programs and information sharing to give workers a personal stake in the company's success.

Soon after opening Hamtramck, Cadillac realized that department managers were awash in useless data. So executives asked department managers what they needed to know to do their jobs. The resulting answers helped redesign information systems into more useful tools.

Nichols sees the changes at Hamtramck from 1985 to today as evolutionary. "Sometimes we're led into making revolutionary change," he said, "throwing massive amounts of technology at a problem. But you're much better served by understanding your processes, controlling them, and then making continuous improvement."

—G. Harrar

Quality Leaders in Automotive

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Buick Motor Division/ General Motors Corp. Flint, Mich.		Charles W. Smith Mgr./Sales IS	Only domestic model to rank in the J.D. Power top 10 for customer satisfaction
Cadillac Motor Car Division/ General Motors Corp. Detroit			Turned an assembly center from a technological mess into an organizational model in four years
Delco Products Division/ General Motors Corp. Kettering, Ohio			Bucked trend toward outsourcing by developing low-cost, high-quality anti-lock braking system for GM
Honda Motor Corp. Ltd. Tokyo			Continuous innovation in its product line
Mercedes-Benz* Montvale, N.J.	\$3.9 B	Vincent L. Morrotti Gen. Mgr./IS	Satisfies customer base with the highest expectations
Motorola Inc. Schaumburg, Ill.	\$10.8 B	Les Shroyer Corporate VP/Dir. MIS & Telecommunications	Creates culture for producing higher-quality products
Nippondenso Co. Ltd. Aichi, Japan			Excels in range of products
Robert Bosch Corp.* N. Suburban, Ill.	\$1 B	Jack Kalina Corp. IS Coordinator	Well-known for specialized technology expertise
Toyota Motor Corp.* Torrance, Calif.	\$14 B	Doug R. Plescia VP/IS	Builds "bulletproof" cars, from fit and finish to power train
TRW Inc. Steering & Suspension Division Sterling Heights, Mich.			Understands processes, tools and techniques needed to produce seating restraints and air bags

*Data supplied applies to U.S. subsidiary.

Like other General Motors divisions, Buick lost much of its design, engineering and manufacturing operations in the massive corporate centralization of 1984. But the firm is making the most of what remains under its control. It modernized its old manufacturing facilities to produce what Jim Wangers, senior managing partner of Automotive Marketing Consultants Inc. in Warren, Mich., calls "the almost perfect car"—the Le Sabre. On the J.D. Power survey, the Le Sabre averaged less than one customer problem reported per vehicle. Buick engineers now go out to dealers to investigate customer complaints. A leaky rear window on the Le Sabre was traced quickly back to a misprogrammed robot's faulty welds. Such attention to detail helped Buick boost sales for the first half of model year 1991 by 6.6 percent, compared with an industrywide decrease of 8.2 percent.

The focus on quality on the part of the large automakers is being passed on to suppliers. Peter Van Hull, director of Automotive Advisory Services at Arthur Andersen in Detroit,

sees the automakers exerting tremendous pressure on their first-tier suppliers. Yet the second tier is still supplying products of uneven quality. "The closer suppliers are to the manufacturer," Van Hull said, "the more attention they pay to quality issues."

In automobile production, one badly designed or manufactured part can lead to an expensive recall or, worse, a well-publicized fatality. Therefore, automakers are requiring suppliers to adhere to stringent home-grown quality standards, such as Ford's Q1 specifications. This means suppliers' products must meet each automaker's slightly different standards. Two of the world's largest suppliers, Nippondenso Co. and Bosch, have earned a reputation for quality in part by marshalling the resources it takes to satisfy various automakers' needs.

Nippondenso, which is affiliated with Toyota, offers everything from instrument displays to radiators and spark plugs. Bosch is known for technical expertise in navigational equipment and suspension systems. The privately held Bosch escapes some of the stockholder pressure that often

turns profits into dividends rather than investing them in research and development.

Another well-known supplier, Motorola Inc., has implemented a program it calls "Six Sigma," which aspires to a minuscule defect rate of 3.4 per million. Some Motorola processes already operate at this mathematical approximation of perfection, enabling the company to eliminate some repair departments and inspection departments. Robert Galvin, chairman of Motorola's executive committee, has said that automakers could scrap defective cars, just as Motorola scraps radios. Few will end up junked, he believes, because organizations naturally change the processes so that they don't build defective products in the first place. Managers and workers alike are held accountable; they know that defects will not be tolerated. [C/O]

George Harrar, co-author of The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corp., is a freelance writer who lives in Wayland, Mass.

CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

CONFERENCE PREVIEW

MONTEREY, CALIFORNIA

SEPTEMBER 22-25, 1991

People Productivity Profit

Workforce Diversity

Competing on
Leadership Alone

People-Centered
Productivity

The New American
Paradigm

Time-Based
Competitiveness

Rapid Technology
Exploitation

Solving the Workplace
Skills Crisis

And More

(see Table of Contents)



TOM PETERS

When "Getting It Wrong the First Time" Pays Off



CONFERENCE OVERVIEW

Joe Levy and Lynda Rosenthal

PEOPLE: THE KEY TO COMPETITIVENESS

Businesses, regardless of their size, must develop and retain a high quality work force to stay competitive.

AGENDA

Session topics, presenters, times and scheduled activities are outlined.

COMPANION PROGRAM

Bring your companion. He or she will join you in conference receptions and meals while enjoying independent activities in the Monterey area.

DEL MONTE GOLF COURSE TOURNAMENT

Lush, scenic and gentle greens are the only way to describe the oldest golf and challenging tournament course west of the Mississippi.

CONFERENCE HOSTS

Select industry innovators in IT products and services will have a display/demonstration area during the conference.

MONTEREY PENINSULA

A spectacular coastline and history, museums, shopping, wineries and fine dining make this area a wonderful destination.

ENROLLMENT FORM

Coin & gear photo, Jim Scherer

Tom Peters photo, courtesy The Tom Peters Group

Conference Overview

The need for a conference addressing the issues of work place literacy, work-based learning, ethnic diversity, and skill competencies has been underscored by President Bush's recent headline-making pronouncements regarding the education and work force crises in America. It is now critical for companies to develop a new corporate agenda to address these issues before they further encumber America's global competitiveness.

American companies are facing a new reality in the labor force. Jobs are changing faster than workers' ability to perform them. Moreover, our educational system is failing. The quality of education in America is being decried in articles from the *Harvard Business Review* to the front page of the *Los Angeles Times*. These dual trends are causing private sector companies to compete not only on product reliability and value, but also as employers. Is computer technology the solution or is it part of the problem? What can the CIO do to ensure that IT helps to avoid the crisis in the work place?

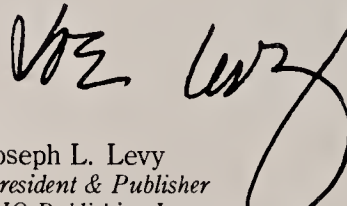
Can IT help manage an ethnocentric work force, make work more satisfying and motivating for workers, and decrease employee turnover while increasing worker productivity? Participants in the next *CIO Perspectives* conference will hear from private and public sector leaders who are successfully administering IT-based programs aimed at addressing these and other issues. Clearly, corporations and the public sector will have to develop a new corporate agenda which includes work-based learning programs designed to create a work force with an acceptable level of literacy skills.

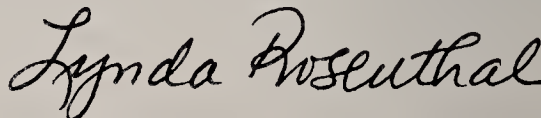


These issues, and the role of the CIO and other corporate change agents in resolving them, will be explored in Monterey, California, September 22nd-25th. At the next *CIO* conference, **IT and the Corporate Agenda: People, Productivity and Profit**, participants will investigate current and emerging seminal issues from business, technological, societal, ethical and legal perspectives. In keynote, general and concurrent sessions, informal dialogues, and a variety of idea sharing opportunities, conference participants will examine how these matters affect their organizations.

If safeguarding your organization's competitiveness in the '90s and well into the next century is important to you, we invite you to join us in Monterey. And we invite you to bring other senior executives concerned with these issues. This is the *only* conference designed to give you practical ideas to help solve the work place skills crisis in your organization.

To guarantee your attendance at *IT and the Corporate Agenda: People, Productivity and Profit*, simply mail your completed enrollment form or fax it to us at 508/872-0618, attention Lynda Rosenthal. Or call toll-free 800/343-4935, extension 4631 (in Massachusetts, 508/935-4631).


Joseph L. Levy
President & Publisher
CIO Publishing Inc.


Lynda Rosenthal
General Manager
Executive Programs

"Most senior executives are feeling the discomfort of a paradigm shift. For years we believed that technology was the key to competitiveness. It is becoming clearer that while technology is important, corporate culture is more important. It is evident that the key to competitiveness both for our nation and our corporations is a culture that focuses on education and improving workers' skills. CIOs who harness IT in support of this new culture will find themselves playing an increasingly important role as this paradigm shift unfolds."

Michael Behar
President and CEO
University Communications, Inc.

People

THE KEY TO COMPETITIVENESS

For years, technology has been viewed as a key to a company's competitiveness. U.S. companies have invested billions of dollars in computers and networks that crunch and carry huge amounts of information at lightning speeds all over the world. But many companies are finding that none of it works without a key ingredient: a high quality work force.

Over the last decade, companies have gradually discovered that their workers lack many of the skills needed in the Information Age. New York Telephone Company had to test 57,000 applicants to find 2,100 who were qualified to become operators and repair technicians. IBM, after installing millions of dollars worth of computers in a Burlington, Vermont, factory, found it had to teach high school algebra to thousands of workers before they could run the machines.

The inadequacy of the American work force to handle the jobs of today, much less tomorrow, puts a heavy burden on American business. "These skills deficiencies are costing American business monetarily, through waste, lost productivity, increased remediation costs, reduced product quality, and ultimately a loss in competitiveness," declared a 1988 U.S. government report.



Index Stock



Superstock

Building A Quality Work Force

For example, one Florida manufacturing company has estimated that it could save up to \$1.2 million a year if its employees had stronger math and reading skills, says the report. The poor math skills mean employees waste materials because they have trouble measuring. The poor reading skills keep workers from reading blueprints correctly, thus forcing the plant to redo orders and pay overtime.

The problem is the result of the confluence of several changes. The U.S. work force is becoming increasingly diverse, with more women and minorities entering the work force than white males. At the same time, the nature of work is chang-

are in their childbearing years. With more women entrants in the job market, corporate help with child care may become a requirement in order to attract the best talent. With the U.S. population aging, companies will not only need to give their employees time off to care for elderly parents, but may also try to entice those elders, many of whom have good skills, back into the work force. With more immigrants coming into the la-

through symbols, both verbal and mathematical. Today's factory worker, for example, must understand statistical process control theory and be able to read charts and graphs that track manufacturing quality levels. If something goes wrong in the process, he or she must have the communication skills to explain the problem, and the reasoning skills to suggest a solution.

Few employers are finding workers



Superstock

ing: This presents unique organization and management situations that businesses must respond to. Unlike the Industrial Age, which required workers to perform manual, repetitive tasks, the Information Age calls for workers to do intellectual and varied tasks. But the U.S. educational system has not only not kept up with these skill changes; it has declined in its effectiveness to educate the population to even minimal levels. And to top it all off, the number of new workers available is shrinking because of a drop in birth rates that began in the 1960s.

The makeup of the U.S. work force is undergoing dramatic change. With this increasing diversity comes a number of challenges for corporate America. And because employers will be desperate for skilled workers, qualified entrants will be in a position to make demands. For instance, three quarters of working women



Index Stock

bor pool, instruction in English as a second language may become a necessity. With more blacks and Hispanics in the work force, the need for corporate-provided education will increase, for these two groups have the highest school drop-out rates in the country, according to *Business Week* magazine.

A Different Skill Set

Concurrent with this shift in the makeup of the workforce has come a shift in the nature of work. Technology has caused an upgrading in the level of skills required in jobs. In today's corporations, computers do many of the repetitive tasks once performed by people. Middle management has been slashed and decision-making power is being pushed down in the organization to the lowest levels. Workers are being asked to direct themselves and to make decisions based on complicated information that is provided to them by computers.

Thomas Bailey, a senior research associate at Columbia University, has called this trend the "upskilling" of American jobs, meaning a change from learning based on observation to learning acquired

with those skills, says the government's report on work force quality. Two-thirds of the employers consulted assessed the current pool of entry-level applicants as being insufficiently prepared in basic skills. "In addition to the three Rs, business noted that today's jobs require skills, attitudes, and abilities generally thought of as needed at the supervisory and managerial level. Businesses, regardless of location, size, or type, consistently noted deficiencies in such areas as problem solving, self discipline, acceptance of responsibility, reliability, initiative, teamwork, and the work ethic. Specifically, in countless conversations, employers reiterated a need for young people to be able to figure out what they need to know and how to find that information. Above all, they note that employees must be able to think their way creatively through tough problems."

And the problem will only get worse. About 90 percent of all scientific knowledge has been generated in the last 30 years, and this pool of knowledge is expected to double again in the next 10 to 15 years, according to the Commerce Department. "Future jobs will be restructured about every seven years and work and learning will be inseparable," predicts David Kearns, former chief executive of-

Motorola Starts a University

In its efforts to increase quality and productivity during the last few years, Motorola began putting more emphasis on training. In 1989, the company declared that by 1992 each and every Motorola employee would receive five full days of training annually.

But when the company began retraining its workers in new quality-oriented manufacturing methods, it had a rude awakening, according to William Wiggenhorn, corporate vice president for training and education. "They couldn't read. They couldn't do simple arithmetic like percentages and fractions. At one plant, a supplier changed its packaging, and we found in the nick of time that our people were working by the color of the package, not by what it said."

Thus, Motorola found that before it could train its employees, it would have to teach them math and English, says Jim Frasier, Motorola University's manager of retraining programs. The company set a goal that by the end of 1992, all U.S. workers would have to meet two criteria: the ability to read and write at the ninth grade level and the ability to do math at the eighth grade level.

These twin efforts, remedial education and lifelong training, were dubbed Motorola University in 1989. Susan Hooker notes that Motorola is deeply committed to lifelong training, and the company backs this commitment with an annual investment of \$120 million in Motorola University.

The company is on track towards meeting its goals, says Frasier. Hooker adds that all the workers at three of the company's U.S. factories have met the criteria. In addition, the company has seen what kind of impact this upgrading of skills has had. Over the two-year period in which training has taken place, Motorola's cellular telephone manufacturing plant has seen a 30 to one reduction in cycle time (the time between placement of an order and delivery to the customer), a 10 to one improvement in quality, and a five-fold increase in the levels of employee productivity that had been predicted for the factory. These improvements were due to both training and to good workplace design, notes Frasier. Frasier says Motorola's investment in training and education will give the company a strategic edge in the 1990s. "People will want to work for us and to stay with us because we provide lifelong learning." ■

ficer of Xerox, who was recently nominated to be deputy secretary at the U.S. Department of Education.

A Lifetime of Learning

Thus, the issue is not just competing for the best people in an increasingly limited labor pool. Constant education and retraining of a company's current work force has become a key to competitiveness. While the 1980s was the decade of quality, during which companies focused on improving the quality of their products and services, the 1990s will be "the decade of people,"

says Jim Frasier, manager of retraining programs at Motorola University.

A few companies are trying to improve their workers' skills. Motorola was among the first to recognize the strategic importance of education and training, starting a corporate training center in 1982 that later grew to be Motorola University. Susan Hooker of Motorola University notes that 75 percent of Motorola's present work force will be with the company in the year 2000, and without a well trained work force, "we won't be in business."

Other corporations also recognize the importance of a well-trained work force.

American Express' success with its Academy of Finance has given birth to a number of such academies in various industries. (See sidebars.) New York Telephone has set up four technology-learning centers where employee skills are upgraded.

These companies have realized that they have little choice but to invest in training and education to help their work force learn the skills that business needs. The alternatives, as listed in the government's report on the quality of the work force, are simply unacceptable:

- employ under-qualified workers, which could result in inferior product quality, thus reducing American companies' ability to compete in the global marketplace;
- competitively seek out qualified workers already employed in other companies, thus driving up the wage scales and reducing American companies' price competitiveness; or
- take the jobs elsewhere, thus reducing American job opportunities and eroding the U.S. economic base.



Superstock

But large expenditures to remediate and train workers should not be looked at as a cost, but rather an investment that is even more important than investments in capital equipment.

According to William H. Kolberg, president of the National Alliance of Business, "The last frontier of international competition, I submit, is the work force. It's the one component we can't export or import with ease and quantity. Those nations that build the best educated and trained work forces into internationally competitive skill forces, will draw the high-skill industries and thus enjoy the higher standards of living." Adds Kolberg, the way companies manage their human resources is becoming a critically important business strategy. ■

Agenda

CIO PERSPECTIVES



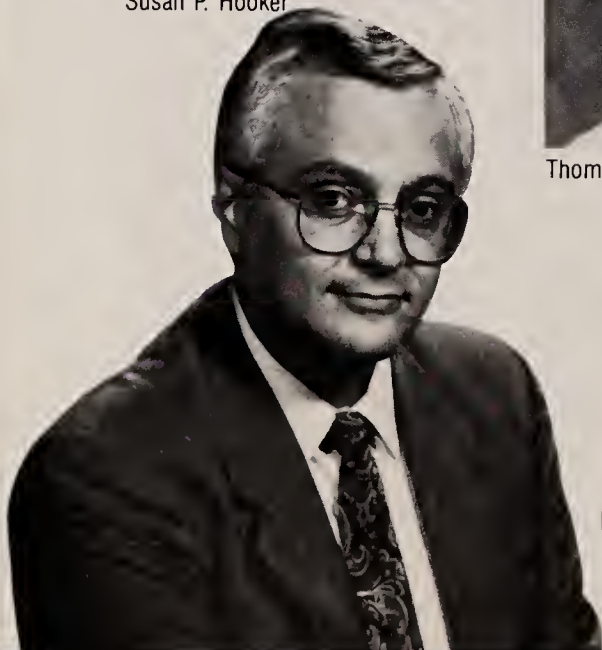
Dr. Robert A. Zawacki



Mitchell Fromstein



Susan P. Hooker



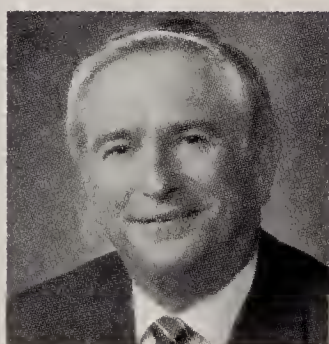
Michael Behar



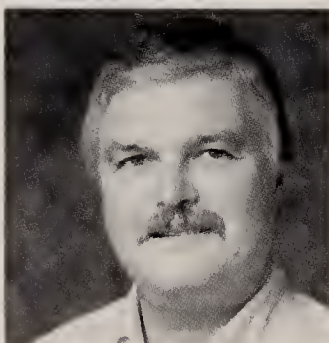
Alan R. Fusfeld



Raymond J. Lane



John Roach



Thomas L. Williams

SUNDAY, SEPTEMBER 22

2:00PM-6:00PM Conference Registration

7:00PM-9:00PM Reception

MONDAY, SEPTEMBER 23

7:00AM-8:00AM Continental Breakfast

8:00AM-8:30AM Welcome & Opening Remarks

Joseph L. Levy, *President & Publisher*
CIO Publishing, Inc.

Conference Overview

Conference Moderator: Alan R. Fusfeld
CEO, Generics North America

8:30AM-9:15AM The Organization and Technological
Change: The Human IS Response

Dr. Robert A. Zawacki, *Professor of*
Management & Organizational Behavior
University of Colorado

9:15AM-10:00AM Vegetables Before Dessert: Facing Up to
IT Realities

Raymond J. Lane, *Senior Vice President*
Booz Allen & Hamilton

10:00AM-10:30AM Coffee Break

10:30AM-11:45AM The Next CIO Contribution: Solving the
Workplace Skills Crisis

Panel Moderator: Michael Behar, *President &*
CEO, University Communications

Mitchell Fromstein, *Chairman and CEO*
Manpower, Inc.

John Roach, *Chairman, President and CEO*
Tandy Corporation

Susan P. Hooker, *Director of Planning, Retraining,*
and External Affairs, Motorola University

Thomas L. Williams, *President Elect*
California Council for Alternative Education

IT AND THE CORPORATE AGENDA: PEOPLE, PRODUCTIVITY AND PROFIT

MONDAY, SEPTEMBER 23 (continued)

11:45AM-1:00PM	Luncheon & Presentation People-Centered Productivity: Turning Down Time into Dollars Graham C. Beachum, Jr., <i>Vice President & General Manager, Tandon North America</i>
1:30PM-6:30PM	Networking & Affinity Groups
6:30PM-7:30PM	Reception
7:30PM-10:00PM	Dinner

TUESDAY, SEPTEMBER 24

7:00AM-8:00AM	Continental Breakfast
8:00AM-8:45AM	Connections: The New Social Contract for the 21st Century Panel Moderator: Robert S. Russell, <i>Vice President, Marketing, AT&T Network Systems</i> Peter Moore, <i>Managing Partner Inferential Focus</i> Dan Stanzione, <i>President, Operations Systems AT&T Network Systems</i>
8:45AM-9:30AM	Forging Closer Bonds With Employees and Customers John W. Biggs, <i>Senior Vice President Hyatt Hotels Corporation</i>
9:30AM-10:15AM	The Formula for Productivity: Putting Information in Usable Form Peter J. Schuyten, <i>Editorial Director Dow Jones News Retrieval</i>
10:15AM-10:45AM	Coffee Break
10:45AM-11:25AM	How To Compete on Leadership Alone Stuart Reeves, <i>Senior Vice President & Member Board of Directors, EDS</i>
11:25AM-12:05PM	Concurrent Sessions (4) The Power Crisis and Its Impact on Computing Environments Joe Binder, <i>Vice President, Marketing Exide Electronics</i>



John W. Biggs



Stuart Reeves



Dan Stanzione



Joe Binder



Graham C. Beachum, Jr.



Peter Moore



Peter J. Schuyten



Robert S. Russell

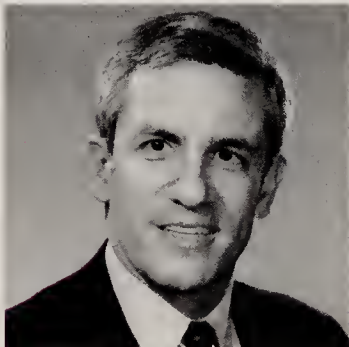
Agenda



Frank Gens



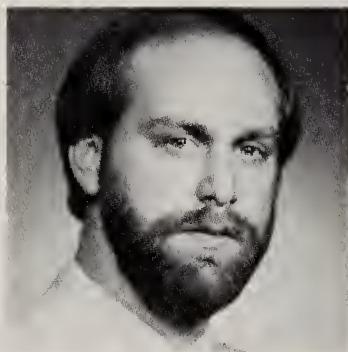
Fred Sammet



Alan Paller



Lewis E. Platt



Jeff Brooks



David A. Kyzer



Clint Kreitner



John W. White



Tom Peters

TUESDAY, SEPTEMBER 24 (continued)

Rapid Technology Exploitation Strategies: Profiting from the Open Systems Upheaval

Frank Gens, *Vice President, Technology
Assessment, Technology Assessment
Strategies Corporation*

EDI: Building Bridges, Breaking Barriers

Jeff Brooks, *President, Brooks Associates*

Fred Sammet, *President*

Interlink Resource Group

IT Value Leading to Enterprise Excellence

David A. Kyzer, *Vice President of Development
Consulting Services, EDS*

12:05PM-1:00PM

Luncheon

1:00PM-1:45PM

EIS: Improving Productivity or High Tech Gadgetry?

Alan Paller, *President, AUI Division
Computer Associates International*

Clint Kreitner, *President*

Reading Rehabilitation Hospital

1:45PM-2:30PM

Information Technology: The Corner- stone of Time-Based Competitiveness

Lewis E. Platt, *Executive Vice President
Computer Systems Organization
Hewlett-Packard*

2:30PM-3:00PM

Using Information Technology to Reengineer the Business Process

John W. White, *President, Information
Technology Group, Texas Instruments*

3:00PM-3:30PM

Coffee Break

3:30PM-5:30PM

Create and Destroy: When "Getting It Wrong the First Time" Pays Off

Tom Peters, *President, The Tom Peters Group*

5:30PM-6:30PM

Reception with Tom Peters

SEPTEMBER 22-25, 1991 HYATT REGENCY, MONTEREY, CALIFORNIA

WEDNESDAY, SEPTEMBER 25

- 7:00AM-8:00AM Continental Breakfast
- 8:00AM-8:45AM Employee Privacy versus Corporate Privilege
Arthur Miller, Esq., *Bruce Bromley Professor of Law, Harvard Law School*
- 8:45AM-9:25AM Concurrent Sessions (4)
- Open Systems: Beyond the Blueprint—Starting to Build
William N. Bonin, *Director of Open Systems Development, Hewlett-Packard*
- CASE Trends and Impact
Lawrence L. Howard, *Director, Worldwide Sales & Marketing, Advanced Information Management Division, Texas Instruments*
- Bringing Top Service to Your Bottom Line
Al R. Mascha, *Vice President, Worldwide Customer Service & Support, Hitachi Data Systems*
- You Can't Work in the Dark: Sourcing Strategies for Enterprise Systems Management
George Kurtz, *Senior Consultant, Computer Associates; Author, "You Can't Work in the Dark! Understanding Automated Data Center Operations"*
- 9:25AM-10:05AM Workforce Diversity: Successfully Managing Tomorrow's Team
Fred Hansen, *Executive Vice President Administration, Hitachi Data Systems*
- 10:05AM-10:35AM Coffee Break
- 10:35AM-12:15PM The New American Paradigm: Developing a Creative Corporate Culture
Mike Vance, *Chairman & Co-Founder Creative Thinking Association of America*
- 12:15PM-12:30PM Summary

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William N. Bonin



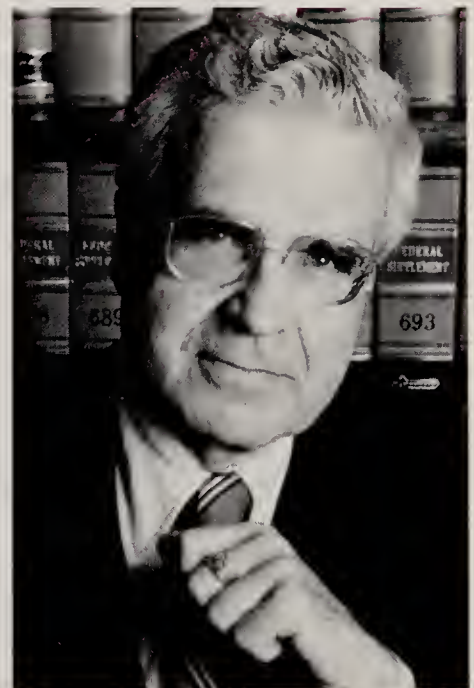
Lawrence L. Howard



George Kurtz



Fred Hansen



Arthur Miller



Al R. Mascha



Mike Vance

Corporate Hosts



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Hitachi Data Systems Corporation (HDS) is a joint venture company owned by Hitachi, Ltd. and EDS. The company markets a broad range of mainframe systems, peripheral products and services. Headquartered in Santa Clara, California, HDS employs 2600 people and maintains more than 100 offices worldwide.



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Tandon Corporation designs, manufactures, supports and services IBM-compatible business and professional personal computer systems marketed worldwide under the Tandon brand name. Incorporated in 1976, Tandon Corporation has been an integral part of the microcomputer industry since its beginning. Tandon has had three progressive growth phases: first, 1976-1979, as the world's largest producer of magnetic recording heads for disk drives; second, 1979-1985, as a leading supplier of complete disk drives for IBM, Tandy and other well-known personal computer makers; and since 1985 as a producer and marketer of its own brand name personal computer systems.



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Texas Instruments is a high-technology corporation engaged in the worldwide development, manufacture, and sale of semiconductors, defense electronics systems, computer and software systems, electrical controls, industrial automation control systems, metallurgical materials, and consumer products. At Texas Instruments, technological leadership and a persistent commitment to quality have been the keys to success.



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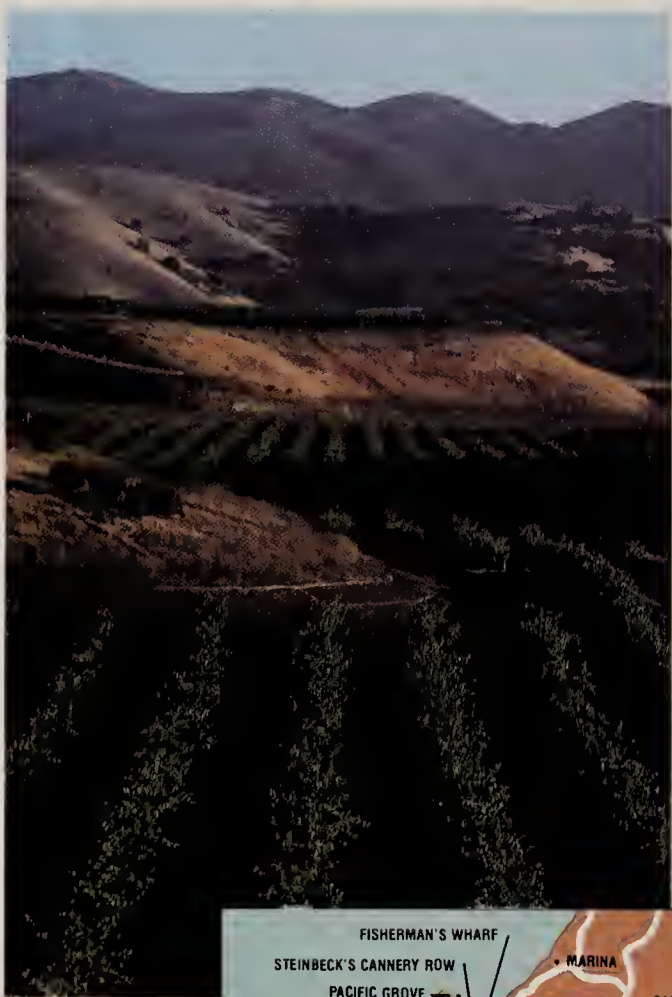
Monterey Bay Area Activities

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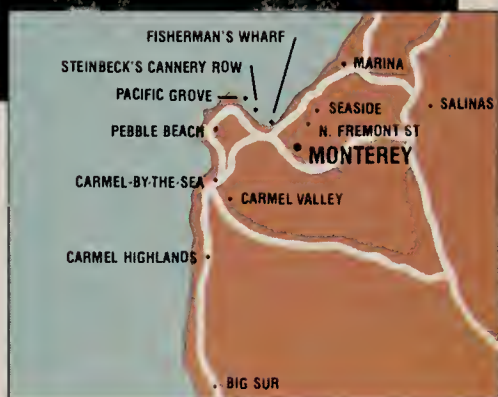
onterey Peninsula boasts a spectacular coastline and over a 400-year history. Central to the whaling and sardine industries from the 17th through the 19th centuries, the Peninsula was an important part of the commercial, political and governmental lives of its inhabitants. Today the Monterey Peninsula is home to artists and poets, some of the world's most challenging golf courses, historical explorations, exquisite scenery, museums, wineries, shops and fine dining.



Bettmann Archives



Craig Lovell, Eagle Visions



Immortalized by novelist John Steinbeck, Cannery Row was once the world's sardine capital. In the late 1940's the sardines disappeared, but a decade later Cannery Row was revitalized. Fine restaurants, art galleries, antique shops, nightclubs and specialty stores are housed in the former sardine processing factories. The American Tin Cannery, home to 45 factory outlets, is the finest outlet shopping in the area. Fisherman's Wharf is also rich in history and excitement, and a great location to watch the seals sunning themselves.

The Monterey Museum of Art is home for such artists as Edward Weston, Ansel Adams, Donald Teague and Charles Russel. In Carmel Village there are various art galleries such as Hanson Galleries, housing one of the most extensive collections of important modern paintings and rare prints featuring Picasso, Chagall, Miro, Dali, Rothe, and Neiman.

The Monterey Bay Aquarium is one of the largest aquariums in the nation. Its many galleries and exhibits explore the marine region of the Bay. You'll see otters, sharks, wolf-eels, starfish and the towering three story California Kelp Forest, the tallest exhibit in the United States.

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The 17-Mile Drive, perhaps the most scenic roadway in America, weaves through the residential community of Pebble Beach. Within this 5,300 acre preserve, protected and nurtured since 1919, are lush gardens and magnificent homes, as well as towering pines, cypress trees, craggy rocks and a spectacular coastline populated by seals, sea lions and otters.

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Since it is our intent to create an informal, relaxed setting throughout the conference, casual attire is strongly suggested. California evenings can be cool, so we recommend that you bring a sweater or jacket.

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\$165 (includes all scheduled food and beverage functions and tours). *

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You may cancel your enrollment up to 30 days prior to the conference and receive a full refund. For cancellations made between 29 and 11 days prior to the conference there will be a \$400 charge. If you cancel within 10 days of the conference or do not attend, no portion of the enrollment fee is refundable. All cancellations must be made in writing. Also, it is your responsibility to cancel your hotel accommodations and transportation arrangements.

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A block of rooms has been reserved for conference participants. We urge you to make your reservations early with the Hyatt Regency at 800/233-1234 (within CA, 800/824-2196). Be sure to identify yourself as part of the CIO Perspectives conference to receive the conference rate. Hotel reservations/cancellations and charges are your responsibility. Shuttle transportation will be provided by the hotel to/from Monterey Airport and is included in your room charge. *

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Please indicate arrival and departure plans below:

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_____ Sunday, Sept. 22
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GOLF TOURNAMENT

A shotgun start golf tournament on the renowned Del Monte Golf Course will be held on Monday afternoon. The cost to participate is \$110 and includes the round, cart rental, use of practice tees, amenities and prizes. If you wish to participate, complete the following:

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IMAGE BANK

Academy Concept Flourishes

As more and more companies have recognized the growing skills shortages in their industries, they have begun to band together to offer training and internships to high school students in an effort to recruit and prepare new entry-level workers. The National Academy Foundation, a non-profit organization, was founded in 1989 to encourage and support these efforts. The Foundation grew out of the success of the Academy of Finance, which was started in 1982 by American Express Company, Shearson Lehman Hutton, and the New York City school system. The Academy is a two-year program combining class-room instruction with on-the-job experience for high school juniors and seniors. In addition to their regular classes, the students take courses in economics and finance and attend seminars. Between their junior and senior years they work as paid interns at financial services firms.

Today, the Academy of Finance is in 45 schools in 22 cities, with a total enrollment of more than 2,600 students. The National Academy Foundation has since started academies in three other industries: travel and tourism, public service, and manufacturing sciences. For more information, contact the National Academy Foundation, 660 Madison Avenue, Suite 1804, New York, N.Y. 10021; phone 212-754-0040. ■

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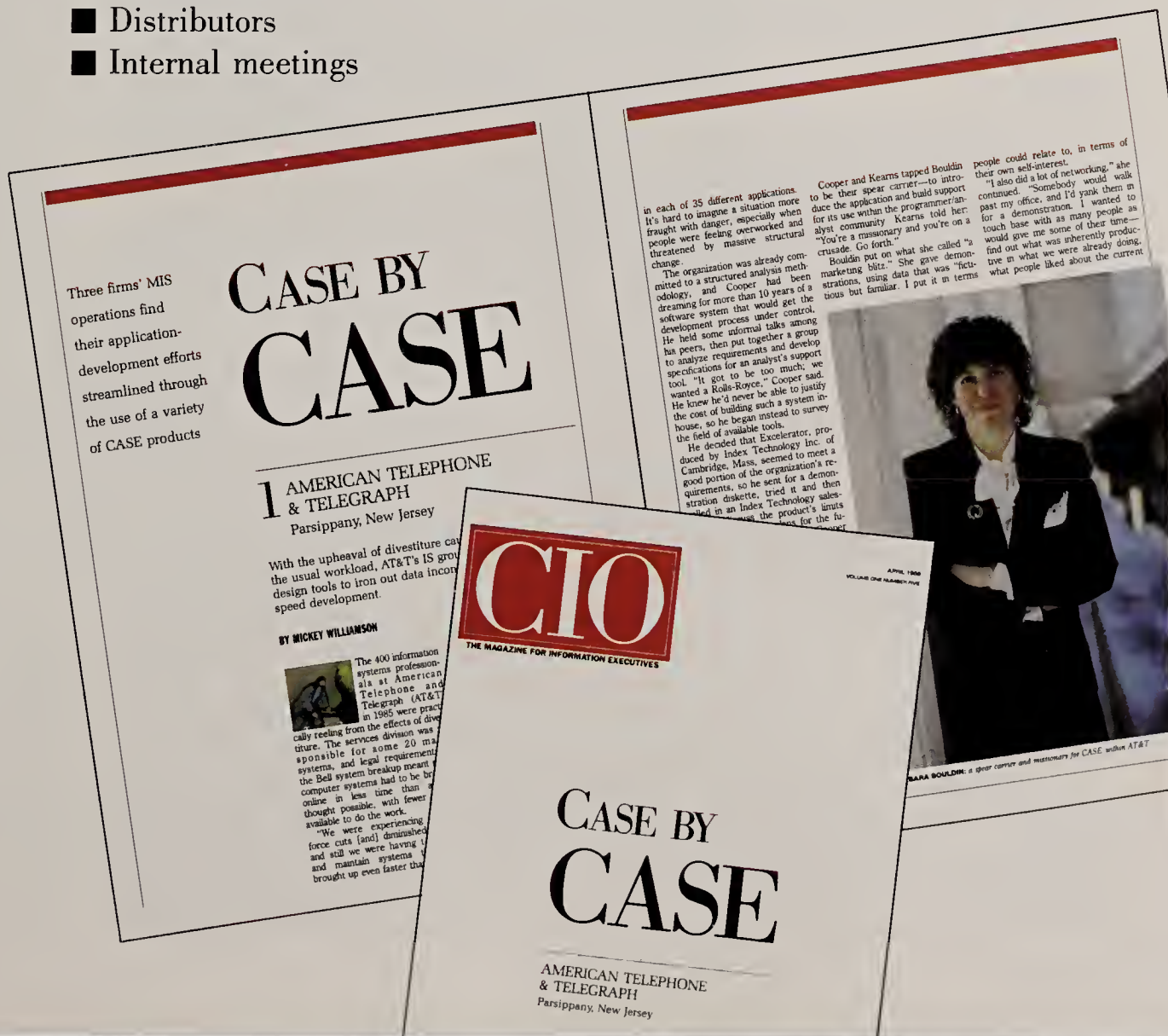
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BANKING

A CREDIT TO THE INDUSTRY

Banking may have fallen on hard times, but a few institutions have committed their human and technological resources to the strategic pursuit of quality

Quality banking—that sounds like the punch line to a joke no one wants to hear. As an industry, banking is in woeful shape. Beginning in the 1970s, commercial banks lost business to money market funds and to such nonbank competitors as General Electric and American Express. The 1980s brought some deregulation to the industry, and more volatility. In recent years, bad loans to risky countries, risky real-estate ventures and risky buyout deals have come home to roost. Over 1,000 banks have failed in the past 10 years, and many others are rocky.

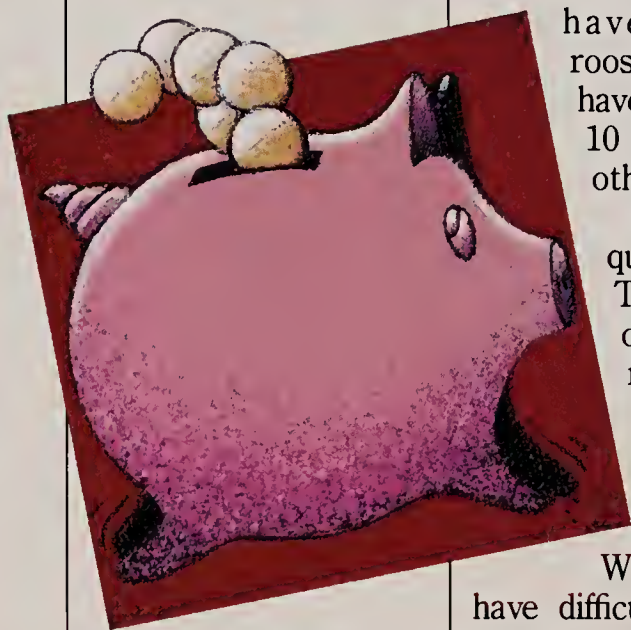
Despite all this, quality banks abound. The 10 banks listed in our 1991 CIO-100 ranks could be matched by a dozen others, large and small, scattered across the nation.

We thought we would have difficulty finding 10 good banks, but the final list from our judges includes 16 other nominations. Each of the banks appearing on this page was nominated by no less than half the judges. Several judges made strong solitary cases for

good banks—Bankers Trust, for one—but the final list should be seen as the top vote getters in a hot multicandidate election.

Each of these banks has made a strong commitment to satisfying the customer. State Street Bank provides good-quality, highly focused service in a niche market—processing mutual fund accounts. Banc One (a unanimous choice) has been an innovative leader in using technology to provide high-quality products and services—and is no stranger to CIO-100 lists. First Chicago intensively trains its staff on how to work with customers, and with each other, to deliver quality service (see related story, Page 47). Morgan is in a class all by itself—it is the Ritz of corporate banking.

Barnett and C&S/Sovran Trust are trying to focus their



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Barnett Banks Inc.
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Citicorp
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State Street Boston Corp.
Wells Fargo & Co.

BY THOMAS KIELY

Open Admissions

organizations on the customer. Barnett, for example, is re-engineering parts of its business and using Malcolm Baldrige National Quality Award criteria as its guide; the bank's quality committee is composed of the president, chief technology executive and other senior managers. C&S Trust actively seeks out customers' requirements, concentrates on preventing errors rather than correcting them and tries to continually improve its services. Wells Fargo, a top-quality retail bank, is experimenting with new incentives to encourage employees to pay more attention to quality. The Royal Bank of Canada is Morgan and Wells rolled up into a single institution.

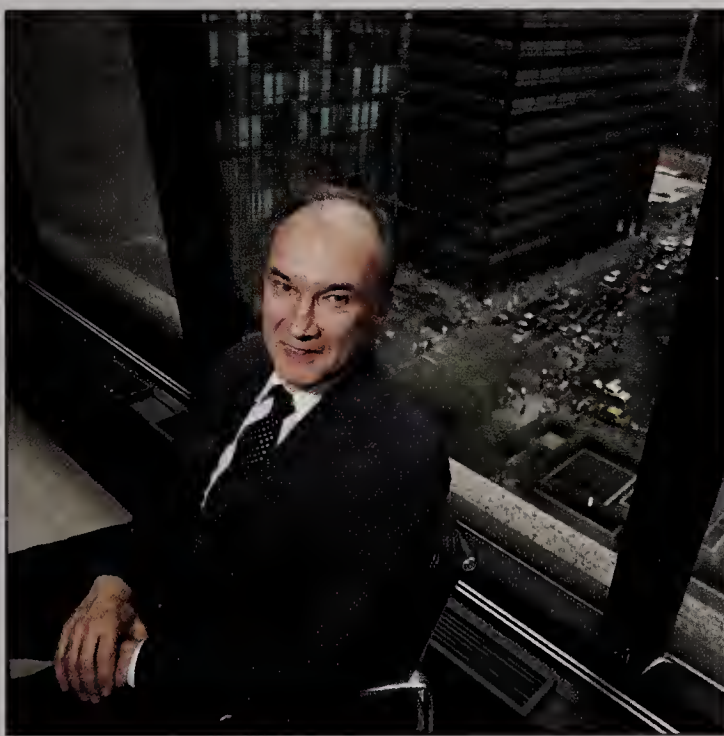
But quality isn't an issue that can be etherized and mounted quite as easily as this, especially not in an industry as volatile as banking. Citicorp and BankAmerica are controversial members of any club of quality banks. The first and second largest banks in the nation (by assets) cannot deliver quality service consistently across the spectrum of their businesses; they deliver solid services to many customers but sometimes aggravate others.

Or again, one measure of quality among banks ought to be good financial performance. Banc One, Wells Fargo, State Street Bank and J.P. Morgan are strong institutions. But investors have become chary of First Chicago, Citicorp and Barnett. At the same time, a few well-performing banks, such as First Wachovia Corp. in Winston-Salem, N.C., were passed over by judges who felt they did not pay enough attention to customer service.

Or, to sound the gong a third time, technology plays a critical role in many of these banks' quality efforts—as it will in the efforts of most organizations (see "Q Tips," Page 26). At State Street Bank, for example, technology is the business. At most banks today, products and services across the board are inextricably linked to technology—check processing, variable mortgage loans, ATMs, electronic fund transfers. Technology also has enabled nonbank

Every Thursday, line managers at First National Bank of Chicago gather for weekly quality performance reviews. Managers "stand up in front of their colleagues and [report on] what didn't go perfectly last week," said Executive Vice President Donald Hollis. "Where did I make a mistake, or where did we fail to satisfy a customer expectation." The presenter must also suggest a solution to the problem; discussion follows. Hollis says the managers "either agree on a solution, or agree on a project that should lead to a solution."

Quality powwows like this aren't unique to First Chicago. But the bank's performance reviews are novel in another respect: Customers are encouraged to attend, and the bank requires its vendors and suppliers to attend. After all, the customer is what quality is all about, and quality management extends beyond corporate borders—vendors have to make the grade too.



DONALD HOLLIS: A run for the Baldrige is a possibility.

Quipped Hollis, "You see the Tandem guy sitting next to the IBM guy, and if there's a problem reported in the IBM environment, the Tandem guy takes as many notes as the IBM guy."

Information is at the heart of these meetings. To First Chicago's managers, quality is measurable: delineated by data and benchmarks, gathered and analyzed through a variety of systems. The manager of data processing, for example, (whose customers

are internal) might report on terminal problems, or on how long it takes Wang maintenance engineers to respond to an outage. Other managers might report on checks processed, or the timeliness of bond transfers.

First Chicago's quality measures sprang from customer surveys conducted in the early 1980s. The surveys illuminated customers' broad concerns, and business units then defined measures for tracking efforts to satisfy those concerns. Originally, IS staff prepared over a thousand charts a week for line managers to use at the meetings. (First Chicago uses data aplenty: The bank measures such intricate details as the number of seconds it takes to answer a telephone in each unit.) Subsequently, IS has compounded some charts to include multiple quality measures.

First Chicago is running for the Baldrige in its own mind. The bank's quality manager is a Baldrige examiner, and this year First Chicago decided to try to meet the Baldrige criteria, but not actually compete. Instead, the bank will hire Baldrige examiners to do a mock site visit and compile a score. If First Chicago scores well on this pretest, it may run for the award for real.

—T. Kiely

Quality Leaders in Banking

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Banc One Corp. Columbus, Ohio	\$225 M	David M. Van Lear Pres. & CEO	Uses total quality as a competitive strategy; intensive team work; skilled use of IT
BankAmerica Corp. San Francisco	\$110 B in assets	Martin A. Stein Exec. VP/Head of BankAmerica Systems Engineering	Pursuing total quality following a successful turnaround
Barnett Banks Inc. Jacksonville, Fla.	\$32 B in assets	Jonathan Palmer Chief Technical Exec.	Involves customers in continuous improvement efforts; redefining business with an eye on Baldrige criteria
C&S/Sovran Trust Co. Atlanta & Norfolk, Va.	\$5.4 B	George Budd Group Exec. VP	Focuses on customer; breaks down walls between functions; trains employees in interpersonal skills
Citicorp New York	\$14.6 B	Colin Crook Sr. Technology Officer	Pursuing global retail banking; takes risks in using technology to provide high quality service
First National Bank of Chicago Chicago	\$51 B in assets	Donald Hollis Exec. VP	Performance meetings open to customers; intensive staff training in quality; uses IT to measure continuous improvement efforts
J.P. Morgan & Co. Inc. New York			High quality products and services to corporate clients
Royal Bank of Canada Toronto	\$107.9 B	Jim Grant Exec. VP/Systems & Technology	Committed to long-term relationship corporate banking and a top-notch retail bank
State Street Boston Corp. Boston			High quality products and services in a niche processing market
Wells Fargo & Co. San Francisco	\$5.9 B		Superior investment products for retail banking customers; innovative use of incentives to promote quality culture

competitors to provide banking services and steal banks' customers. Then where on this list are such hot technology banks as CoreStates Financial Corp. of Philadelphia?

The relationship between technology and quality is uncertain, contends Diogo Teixeira, one of our banking judges and a partner in Ernst & Young's Center for Information Technology and Strategy in Boston. "We don't really know yet how to link financial performance to technology strategy," said Teixeira, who co-authored the book *Technology in Banking*. "And we don't even know how to measure the overall quality of the technology investment banks have made, if you look at the total technology infrastructure."

In other words, quality has a context. "Quality is a valid [competitive] theme to look at in banking today," said Daniel Kreps, principal consultant at SRI International of Menlo Park, Calif., and another judge. Kreps argues that quality is one of five critical issues banks face—the other four being productivity, risk management, innovation and the right strategy or business mix for an institution's business portfolio.

Quality has a keener edge in California, it seems. Banking regulations

have long kept banks bottled up in geographical regions, and one of the most competitive regions is California—a fast-growing state that represents a sizable portion of the nation's economy. As a result, California banks have adopted customer service as a weapon in their banking wars. Wells Fargo has grown steadily through acquisition but has consistently tried to maintain a studied focus on customers, old and new. BankAmerica stumbled badly in the 1980s but has made a remarkable recovery—and two of our judges note that the bank recently embraced total quality management as a competitive strategy for the 1990s.

Victoria Taylor, director of quality assurance at C&S/Sovran Trust Co., believes that quality will prove its competitive mettle in the banking industry in the years ahead. (Taylor is one of three Baldrige examiners among our banking judges.) "Total quality is becoming a recognized business discipline for achieving financial success," she said.

Banc One already uses quality competitively. Last year, the bank figures it saved over \$12 million through quality improvement projects. Charles Aubrey, the bank's chief quality officer (and another

Baldrige examiner on our panel), says that quality is a strategy to lower expenses and to charge somewhat more for higher quality—thereby fattening margins.

Japanese institutions may dominate other lists in the CIO-100, but not here. Those familiar with Japanese banks say that American bankers are far out in front in the race to woo and please customers. Japanese banks are so form-conscious that even the simplest transactions—cashing a traveler's check, for instance—can be complicated. Customers are often asked to wait while forms are processed and reprocessed. The quality of banking products at some Japanese banks, however, is very high.

Finally, many smaller institutions were nominated to this august list. Each judge had different favorites. One nominated Wilmington Trust of Delaware and Synovus Financial Corp. of Columbus, Ga.; another, Silicon Valley Bank of Santa Clara, Calif., and US Bancorp of Portland, Ore. Others mentioned Valley National Bank of Las Vegas, Harris Bank of Chicago and Norwest of Minneapolis. As the industry consolidates, many of these banks may be swallowed up by larger institutions. ☐

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For IT vendors, quality means anticipating user needs and delivering the right innovation to the right customers at the right moment and for the right price

Faster, smaller, cheaper: the mantra of the computer industry in the 1980s. And each new product was touted as the next step on the road to nirvana. All too often, however, faster, smaller, cheaper are all that computer manufacturers have delivered; and those attributes, no matter how welcome, don't add up to total quality.

Just as significant as the products themselves are the processes that surround their design, delivery and support.

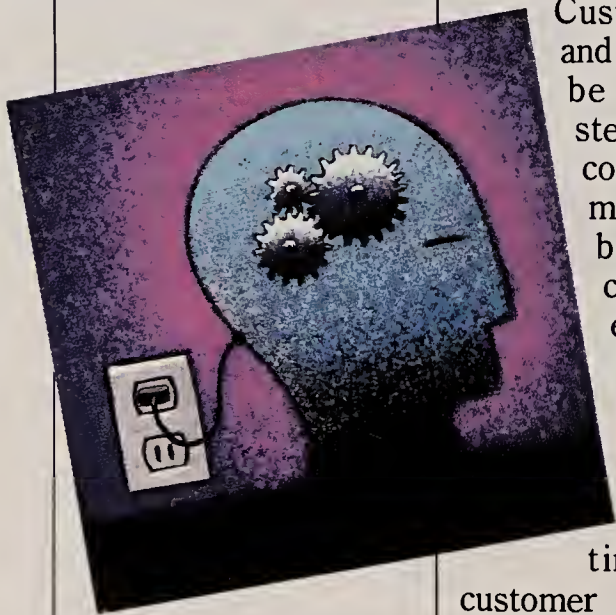
Customer expectations and requirements must be considered every step of the way. Accordingly, total quality management is fast becoming the new credo of the computer industry. As one would expect from the companies in this industry, IS helps light the way.

Accurate and timely definition of customer requirements is essential. Timeliness is the catch, however, because customer needs change with every season. "Customer requirements have changed dramatically in the last 10 years and will change dramatically in the next

10," one judge said. "So staying close to them is very much part of the quality process."

Computer manufacturers must do better than merely respond to user needs; they must actually stay ahead of them, delivering technology at just the right moment. "There must be an emphasis on getting products out in the minimum amount of time, because the market window stays open for only a short period," said one judge. "Prices in this industry deteriorate by 1.5 percent a month, so if you're two months late, you lose a substantial part of the investment."

IBM won unanimous kudos from panelists for its attention to customer requirements in the design of everything from 3270 terminals to the personal computer, from the RS/6000 workstation to the AS/400 (whose manufacturer, the IBM



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Apple Computer Inc.

Borland International Inc.

Compaq Computer Corp.

Digital Equipment Corp.

Hewlett-Packard Co.

IBM Corp.

Microsoft Corp.

Storage Technology Corp.

Xerox Corp.

BY LESLIE GOFF

division in Rochester, Minn., won the Malcolm Baldrige National Quality Award). Despite IBM's reputation for ruling the market in part by virtue of its size, judges noted that the durability of the de facto standards set by IBM products is a proof of the company's customer orientation.

At IBM, noted one judge, "There is a corporate policy that from day one a new product must be as high-quality as the product it is replacing." Timely delivery is achieved, in part, by the use of streamlined manufacturing systems driven by artificial intelligence-based scheduling and production software.

Perhaps the best example of a company anticipating a user requirement before the users themselves is Apple Computer Inc. Apple tapped into an unforeseen demand when it introduced the Macintosh in 1984. Suddenly users had a consuming need for desktop publishing and, later, desktop presentation. Apple also has been savvy about leveraging its internal IS to solve user problems. Even before the Macintosh, the company had linked Apple 2 computers to IBM System/38s internally and parlayed that into some of the early interfaces between desktop systems and larger computers. Essentially, Apple ingratiated itself into the market by recognizing the real-world customer reality that the Macintosh was a nonstandard platform.

Producing defect-free products poses significant challenges for companies whose internal quality procedures don't measure up, judges said. In the worst-case scenario, a company rushes to exploit a market opportunity and delivers a product that doesn't work, a particularly damaging mistake for software providers. Judges mentioned Ashton-Tate, which today is mired in Chapter 11 in part because it rushed to market with its dBase IV before significant bugs were ironed out.

Enter Borland and its Paradox database package. Judges nominated the software company for its sound, innovative execution of products that outperform the competition. Borland also gained market share for its

A Mania for Improvement

Last May, Hewlett-Packard Co. completed a major restructuring of its information technology group aimed at aligning the IT function more closely with the company's business units. The reorganization exemplifies the IT group's involvement in HP's quality efforts, a key component of which is the continuous improvement of processes.

"IT plays a major role in re-engineering business processes," said Lloyd Taylor, director of corporate information systems at the Palo Alto, Calif.-based company. "There are hundreds, potentially thousands, of improvement efforts going on in the company."

For instance, HP is deploying a Unix-based client/server application, the Software Quality Information System, to facilitate the improvement of its software. "It allows anyone in the company to record internal software defects and transfer that information anywhere in the company globally,"

Taylor said. Employees can analyze defects more completely, summarize those that are similar and record their resolution.

HP also is re-engineering its order-fulfillment process. "We want to reduce errors and make significant improvements in on-time delivery," Taylor explained. The project addresses three areas: delivery of off-the-shelf products, such as the HP LaserJet; delivery and installation of customized, integrated HP systems, such as an HP 3000



LLOYD TAYLOR: "There are hundreds, potentially thousands, of improvement efforts going on in the company."

with associated peripherals; and delivery of customized stand-alone products, such as an HP oscilloscope. Three teams of IS staff and individuals experienced in the overall process are studying each area to determine where processes can be simplified and time cycles shortened.

IT's role in HP's quality efforts is nothing new. HP has deployed a database that enables engineers to design products concurrently both for high-quality and for optimum manufacturability. The database details HP's preferred parts and materials, including specifications, information on approved vendors, pricing, existing supplier contracts, and more.

In addition, at automated response centers, customer service engineers have access to online information about HP products, customer sites and recurring problems. A voice response system determines the nature of each call and an automatic call distributor routes it to the appropriate person. If the problem cannot be solved over the phone, the engineer can automatically dispatch a field service representative and transfer all information via a nationwide TCP/IP internetwork.

—L. Goff

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Network Systems

Quality Leaders in Computers & Communications

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
AT&T New York	\$37 B	William F. Osi Jr. VP/Information Management Services	Long history of product quality; customer perception of service quality is high; excellent process management
Apple Computer Inc. Cupertino, Calif.	\$5.7 B	Deborah A. Coleman VP/IS & Technology	Anticipated and filled a market niche with high-quality products before anyone else
Borland International Inc. Scotts Valley, Calif.	\$226.8 M	Bruce Runyan Dir./MIS	Consistently provides users with software that outperforms the competition and with better price/performance
Compaq Computer Corp. Houston	\$3.6 B	Fred P. Jones Dir./Information Management	Has excellent distribution network; consistently anticipates and meets customer needs; very high-quality products
Digital Equipment Corp. Maynard, Mass.	\$14 B	Dan Infante VP/Information Management & Technology	Strong engineering staff known for technical quality; customer support centers designate one person per customer call; compensation based on customer satisfaction
Hewlett-Packard Co. Palo Alto, Calif.	\$13 B	Lloyd Taylor Dir./Corporate IS	Consistently produces high-quality products; has high-quality manufacturing processes
IBM Corp. Armonk, N.Y.	\$69 B	Larry J. Ford VP/Information & Telecommunications Systems	Works closely with customers to meet needs and expectations; has implemented TQM across company, especially in manufacturing; sets long-lasting industry standards
Microsoft Corp. Redmond, Wash.	\$1.8 B (est.)	Neil R. Evans Gen. Mgr./MIS & Corporate Services	Delivers timely products without sacrificing customer needs to rush to market; protects customer investment with upward compatibility
Storage Technology Corp. Louisville, Colo.	\$1.14 B	Rich Nortnik Dir./MIS	Engineered highly successful comeback from Chapter 11; filled a customer need with a high-quality, reliable product (the Automated Cartridge System, a robotics-based online tape library)
Xerox Corp. Stamford, Conn.	\$17.9 B	Patricia C. Barron VP/Corporate Information Management	Aim of 100 percent customer satisfaction drives all processes; successfully streamlined processes and suppliers to reduce cycle times and respond to customer expectations

QuattroPro spreadsheet (over which Lotus Development Corp., maker of 1-2-3, has brought a copyright infringement lawsuit that, as of press time, was still pending).

Microsoft Corp. has even been known to hold up delivery rather than sacrifice quality, judges said. As a result it has one of the best track records in the industry for delivering high-quality operating systems and applications. Judges credit the company's leadership for establishing a far-reaching vision and for attention to the company's embedded software base. Each new Microsoft release features upward compatibility with its predecessor, guaranteeing ease of use for existing customers.

Besides ease of use, customers value vendors who are willing to respond when problems of use crop up. Hewlett-Packard Co., besides its reputation for making high-quality products, has developed a name for quality service. In particular, judges praised HP's field service organization. Automated customer-service centers on both coasts take customer calls and dispatch field engineers,

helping give the company its edge (see related story, Page 51).

Competition from Japanese companies that have actively deployed TQM systems will drive the evolution of total quality management in the United States, according to judges, and information systems will play a critical role in the process. Employees must have information at their fingertips if they are to contribute effectively to the quality effort.

Xerox Corp., another Baldrige winner on the CIO-100 list, has already moved to give employees the information they need to carry out its total-quality mission. The company, for instance, was an early user of executive information systems. This and other steps taken by IS to integrate the company's processes helped Xerox recover from a rocky period in the early 1980s. Although the company never took a loss, earnings declined 29 percent in 1982, compared with 1981, and fell 38 percent in 1984 from the prior year. Xerox's proactive IS group also has devised systems to support billing, product delivery, manufacturing and

other internal processes.

IBM is another organization where IS has taken the responsibility for converting data to information and delivering it to all parts of the company. One judge noted that the company has completely revised its IS strategy to emphasize internal and external customer requirements. IBM also has turned internal strategies into external products. An expert system developed to guide IBM's internal PC help-desk staffers through problems and solutions, for instance, has been packaged for sale to customers who want to develop a customized program for their own internal help desks. For customers who lack the programming capacity to develop their own, IBM peddles the service.

"Accessibility to information clearly gives a competitive edge," one judge said, "and the information systems strategy must be aligned with, and a major part of, the total-quality management system." □

Leslie Goff is a freelance writer based in New York.

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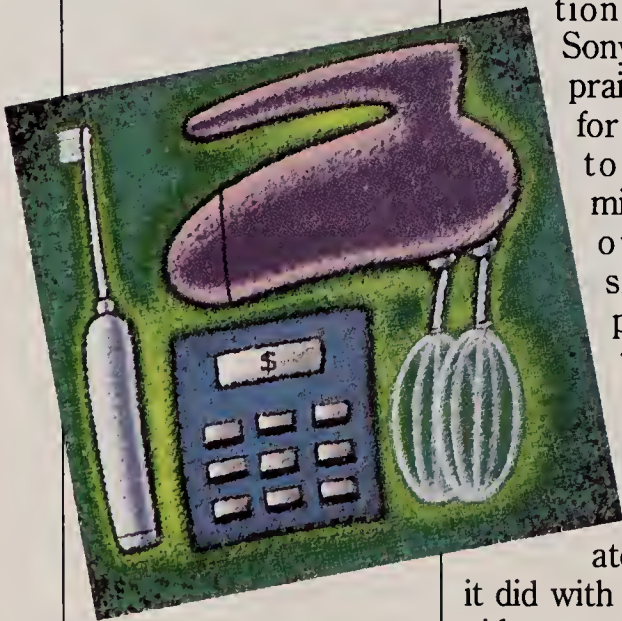
Japanese companies prove that IT is no substitute for making quality an integral part of the engineering and manufacturing process

It's no surprise that Japanese companies dominate the CIO-100's consumer electronics category. After all, they dominate virtually every market segment in this industry in sales. What's so great about the Japanese stuff? Just about everything, according to the judges.

In fact, most judges noted that so many Japanese companies have gotten quality right in this business that it was difficult to pick from among them. There were no hesitations about selecting Sony, though, which was praised by all the judges for its apparent ability to read consumers' minds and then turn out brilliantly designed, highly reliable products that meet their needs and wants. And Sony doesn't restrict itself to meeting needs; it can create entire markets, as it did with personal stereos and videocassette recorders. (Serendipity and executive vision help: The prototype Walkman was cast aside as a failure because it couldn't record, until Sony founder and honorary chairman Masaru Ibuka saw one sitting on a desk and suggested hooking it up to a lightweight headphone under design elsewhere in the company.) As for Sony's legendary product reliability, one judge theorized it stems from the fact that the company had such a sparse service network in the 1960s that its best bet was to make products that rarely broke.

Also arousing the judges' enthusiasm was Matsushita's broad product line, which approaches Sony's product performance and reliability at a generally lower price. Although no U.S. company matches these Japanese manufacturers in quality across a wide range of consumer electronics, Motorola and Bose made the list for the superior design of products in more specific markets—Motorola in cellular phones and pagers, and Bose in audio components.

Where does IT fit in? Per-



HONOR ROLL

Black & Decker Corp.
Bose Corp.
General Electric Corp.
Matsushita Electric Corp.
Maytag
Mitsubishi Electronics
Motorola Inc.
Sony Corp.
Toshiba Corp.
Whirlpool Corp.

BY DAVID FREEDMAN

Made Better in the U.S.A.

It was 13 years ago that Motorola's management, having recognized that the company significantly lagged behind its Japanese competitors in quality, set out to design and implement a quality improvement program of seemingly absurd ambitions. The company wanted to improve quality by a factor of 10 within five years, and then go on to reduce product defects to fewer than four per million units. Both goals were achieved, and Motorola is now held up as an example of how U.S. companies can match and even better the Japanese in quality.

To be sure, IT has played a role in Motorola's pursuit of quality, said Les Shroyer, corporate vice president and director of MIS and telecommunications. But it's not the dramatic kind of role that some glamour-craving CIOs might envision. "We don't think in terms of killer applications that will single-handedly improve quality," explained Shroyer. "It's more a

case of providing 105,000 employees around the world with the IT they need to do their jobs."

Most of these applications are the typical systems that any large manufacturing company would run. In fact, Shroyer said his preference for avoiding ambitious "grand-design" types of applications is one of the reasons his group has been able to help Motorola achieve its goals. "The only way to . . . effectively support the business with IT today is to deliver



LES SHROYER: "We don't think in terms of killer applications."

technology in accelerated cycles," he said. "If you can't cut the cycle time by one or two orders of magnitude, then IT will simply be in the background rather than the mainstream. Setting a goal of a 50 percent improvement in IT will just allow you to fade away a little more slowly."

That doesn't mean Shroyer can't point to any efforts of which he is particularly proud. He noted that the company's beefed-up communications network allows engineers and other professionals scattered around the world to swap massive amounts of technical and other information instantly between workstations, supporting the company's move to spread the production of individual products across its various facilities.

And a revamped financial reporting system has reduced the time it takes to put a monthly P&L statement on executives' desks from two weeks to four days, enabling managers to respond more quickly to fast-breaking trends. Of course, Shroyer thinks that's not nearly fast enough. "We're working on a system that will cut it down to eight hours," he said.

—D. Freedman

haps most telling is the fact that although Japanese consumer electronics companies clearly outstrip their U.S. counterparts in quality, they are widely considered to lag behind U.S. manufacturers in IT. Japanese quality, said the judges, comes not from automation or sophisticated use of information, but from excellence in design engineering (though computer-aided design helps here) and from quality assurance efforts that are intimately integrated into the engineering and manufacturing environments, rather than bolted on as they are at many U.S. companies. "The Japanese don't treat quality as a separate program, the way we do," said one judge. "It's part of everything they do." All the judges agreed that information technology is no substitute for this kind of total integration. One noted that U.S. companies wasted a lot of time and money installing robots in the late 1970s and early 1980s, under the mistaken assumption that this sort of automation was behind the Japanese advantage. "We were following a false trail," he said.

U.S. companies' edge in IT may actually have hurt their drive for quality, insisted another judge, who pointed out that sophisticated systems often camouflage overly complex and inefficient business processes. "The Japanese keep things simple," said this judge. "If we simplified our processes in the same way, and then applied our skills with information technology, we could have a real advantage in quality."

Bose is one company that seems to have done just that. Though a focus on product excellence is at the core of the company's success, it has also invested heavily in information systems that can improve customer service. One example: a new barcode-based shipping and distribution system that will speed delivery of products and reduce shipping errors. Motorola also received praise for having souped up its IT efforts in step with its celebrated pursuit of quality (see related story).

But while most U.S. companies struggle to improve product quality, Japanese companies are increasingly

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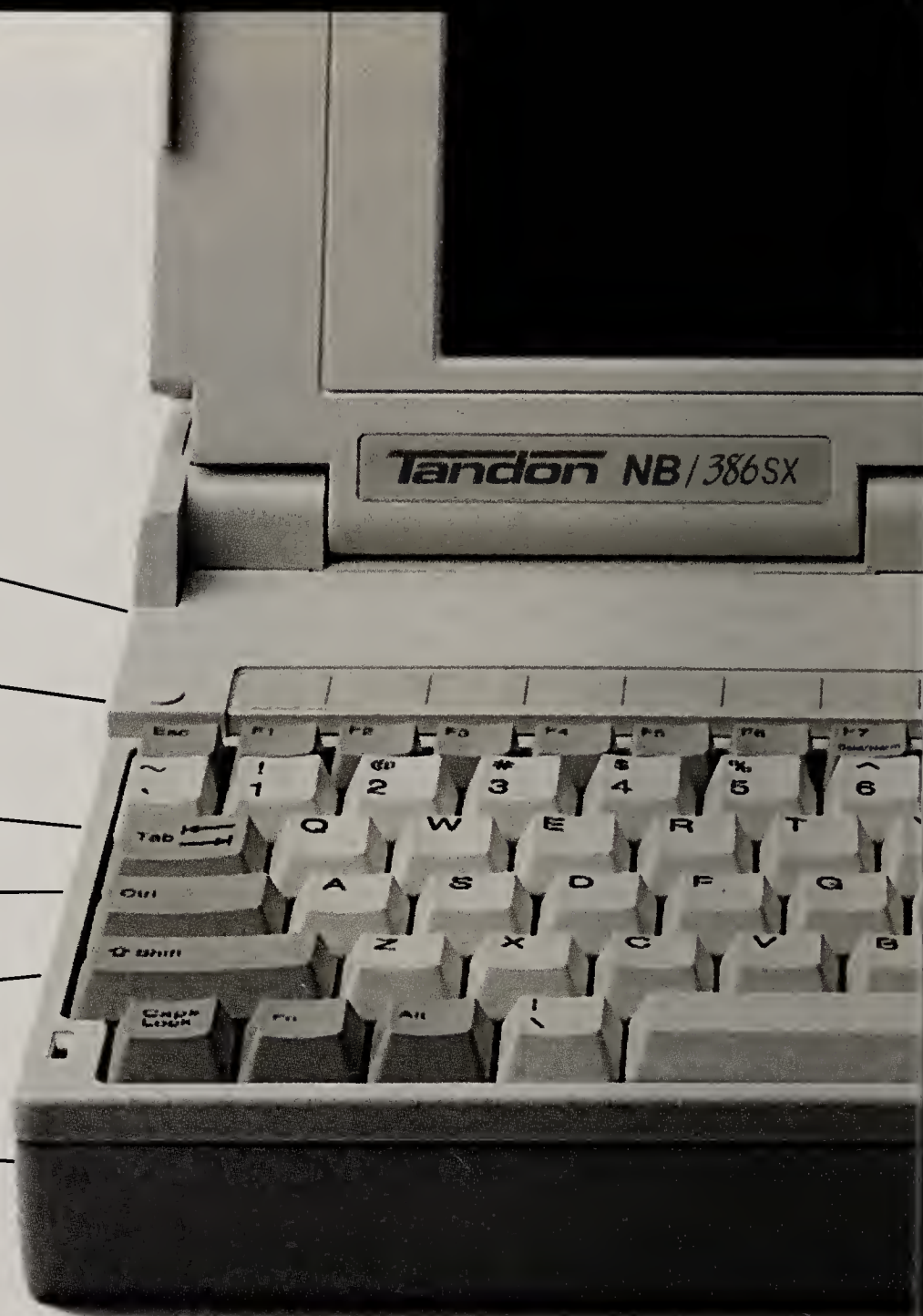
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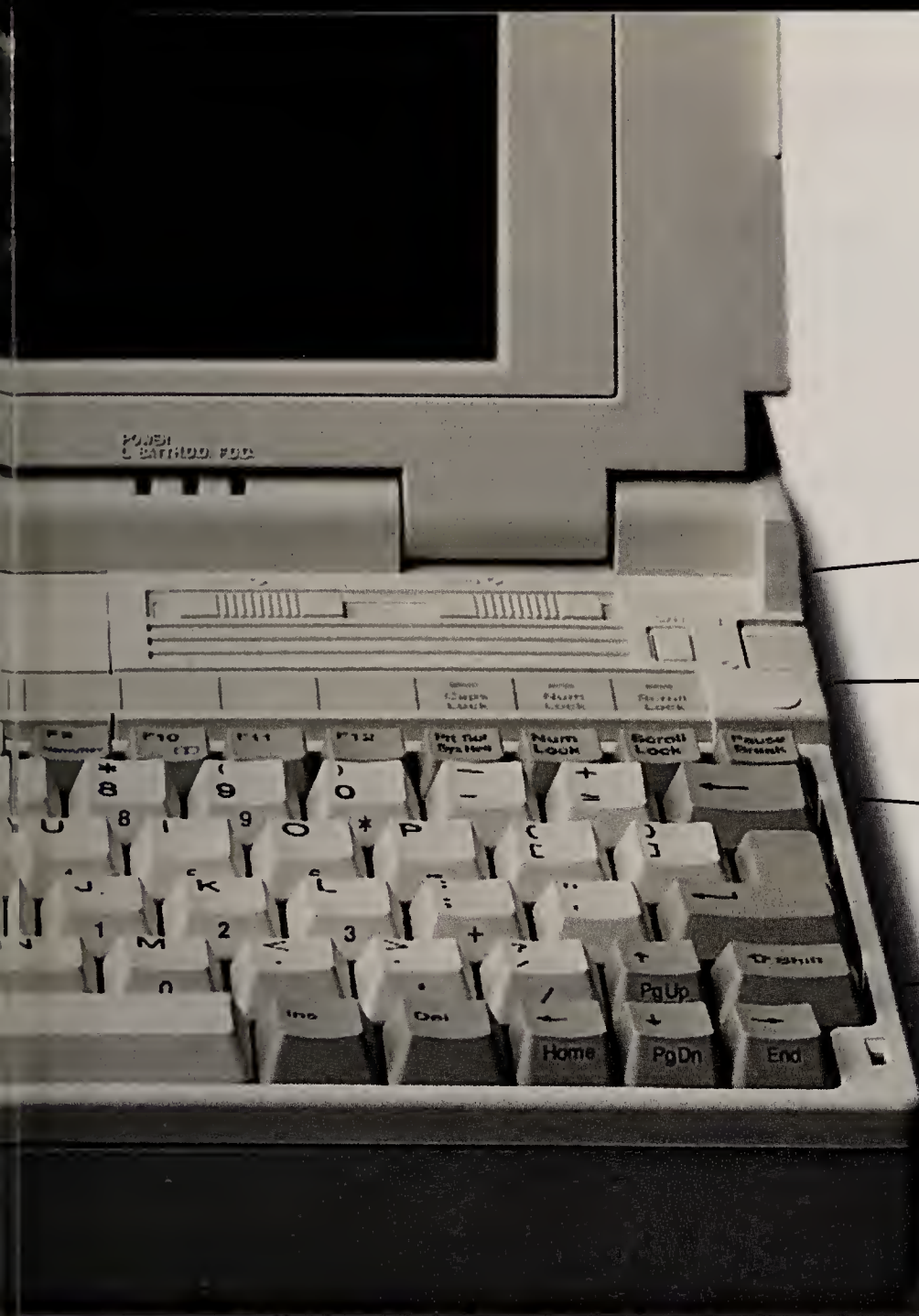
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Quality Leaders in Consumer Electronics & Appliances

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Black & Decker Corp. Towson, Md.	\$5 B	Sid Diamond VP/Worldwide Information Services	Innovative design of small appliances
Bose Corp. Framingham, Mass.	\$400 M	Warren Harkness Dir./Information Services	Innovative product design and formal quality-control programs
General Electric Corp. Fairfield, Conn.	\$58.4 B	Edward J. Skiko VP/Information Technology	Toll-free help line and consumer feedback programs
Matsushita Electric Corp.* Secaucus, N.J.	\$5 B	Hachiro Noguchi Gen. Mgr./Information & Communication Systems Center	Good performance, reliability and value in wide range of products
Maytag Newton, Iowa	\$3 B		High product reliability and responsive customer service
Mitsubishi Electronics* Cypress, Calif.	\$1.8 B	John Nomura VP/MIS	Innovatively designed, high-performance televisions
Motorola Inc. Schaumburg, Ill.	\$10.8 B	Les Shroyer Corp. VP/Dir. MIS & Telecommunications	Cellular phones rated high in design and reliability
Sony Corp.* Park Ridge, N.J.	\$4.5 B	Robert L. Trenchard Sr. VP/MIS	Leader in defining customer needs and satisfying them with innovative products
Toshiba Corp. Tokyo	\$31.03 B	Koji Okamoto Gen. Mgr., Total Information & Systems Division	Televisions and personal stereos rated high in performance and reliability
Whirlpool Corp. Benton Harbor, Mich.	\$6.6 B	Richard D. Koeller VP/Information Technology	Good product reliability and value

*Data supplied applies to U.S. subsidiary only

looking to narrow the gap in IT. Sony is a leader here, having already surpassed many large U.S. companies in the sophistication and breadth of its systems. Among the IT efforts Sony has undertaken to improve quality are automated manufacturing-defect detection and correction systems, a new worldwide distribution system to chop the time it takes to get the right product to the right stores, and a parts distribution network to improve customer service. The company is also employing artificial intelligence in at least two new systems: One will automatically configure components to meet the needs of buyers of more complex products like television studio equipment, and the other is . . . well, a secret. "It's too strategic to discuss," said Robert Trenchard, Sony Corp. of America's senior vice president of MIS.

When it comes to quality in household appliances, reliability is paramount. Maytag and Whirlpool won top honors here, though judges noted that the actual reliability of Maytag's products seems to be slipping behind public perception. General Electric and its appliances made the list, even

Japanese quality comes from excellence in design engineering and from quality assurance efforts that are intimately integrated into engineering and manufacturing.

though judges noted that the company hasn't yet overcome the sorts of design and manufacturing problems that led to the early demise of the compressors in tens of thousands of its refrigerators.

What GE does have going for it, said the judges, is a toll-free help line that provides knowledgeable and reasonably sympathetic technical and other advice to buyers of virtually any GE product, often obviating the need for service calls.

Despite the strong IT efforts of some appliance manufacturers, the judges felt that IT isn't in a position

to significantly impact all-important reliability (with the exception, again, of computer-aided design). Whirlpool and other U.S. companies are developing impressive manufacturing resource planning, inventory and distribution systems, they noted. But some judges warned that unless the resulting efficiencies can be converted into investments in better design and manufacturing processes, these companies are going to find themselves losing market share to high-reliability appliance manufacturers from Europe.

Some judges predicted that more appliance companies will follow GE's lead by instituting effective help lines, an IT-intensive process that requires a strong communications network and a system capable of supporting help-line staff with a large array of product information. But they noted that while such customer service-oriented efforts do contribute to quality, they should only be viewed as a sideline to the real quality task: building products right in the first place. ☐

Dave Freedman is a freelance writer based in Brookline, Mass.



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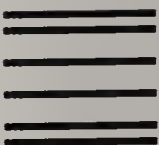
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ELECTRONIC DEVICES

SILICON PEAKS AND VALLEYS

In an intensely competitive commodity industry, customer loyalty is hard to win and easy to lose, and having approximately perfect products is only the beginning of quality

In an industry as volatile and globally competitive as semiconductors, the word *quality* triggers an immediate reaction. The semiconductor makers all insist they've got it, while the industry analysts say that a quality chip is simply table stakes to play in the game.

"Everybody makes about the same product," said Richard L. Whittington, senior vice president and industry analyst with Kidder, Peabody & Co. Inc. "Without a quality product, you simply don't achieve market share."

For U.S. companies still struggling to rebound from Japan's dramatic surge in the business during the 1980s, quality is no longer a concept—it's an obsession. Such companies as Motorola and Texas Instruments, both on the CIO-100 list, have embarked on massive internal quality programs in the past decade with dramatic results: TI won Japan's revered Deming Prize in 1985 and Motorola won the first Malcolm Baldrige National Quality Award in 1988. "By the mid-'90s you won't even be considered [by prospective customers] if you don't have a few

quality awards," said Daniel Klesken, vice president and senior semiconductor analyst with Prudential Securities Inc.

That said, quality is not simply a product issue but a total organizational issue—from dealing with suppliers, manufacturing and delivery to service and support. In these areas information systems play a critical role in what has become a dogged pursuit of a quality stamp of approval. "Quality is measured in terms of on-time delivery and consistency," said William Tai, vice president of Alex. Brown & Sons. "The companies with better information management tools are obviously in a better position." Newer companies, like Cypress Semiconductor, used IT to build a quality organization from the beginning, he said, while older companies have had to learn the hard way.

HONOR ROLL

Analog Devices Inc.

Cypress Semiconductor Corp.

Fujitsu Ltd.

Hitachi

Intel Corp.

Motorola Inc.

National Semiconductor

NEC Corp.

Texas Instruments Inc.

Toshiba Corp.



BY GLENN RIFKIN

Blue-Chip Performer

The accessibility and rapid movement of critical information is essential to maintaining quality in the semiconductor business, added Mark Giudici, associate director at Dataquest, a high-tech market-research firm in San Jose, Calif. Giudici has found a direct connection between IS and the quality process at companies such as Motorola, Texas Instruments, Intel, Analog Devices and Fujitsu. The goal, he said, is prevention rather than cure. Companies must look at the tangibles, such as error rates per million, lengthen the mean time between failures, and extend the quality of products up front. "Processes that use automated systems to get those problems nipped in the bud at the component level rather than the systems level have an obvious advantage," Giudici said.

It is no wonder, therefore, that Japanese companies such as Hitachi, Fujitsu, NEC and Toshiba have fared so well internationally. Beyond the thorny issues of trade barriers, chip dumping and general protectionist battles, the Japanese companies hold a high common ground: quality. And since all of these companies are also top manufacturers of information systems, they have a built-in advantage, according to Tai.

Warren Evans, manager of total quality research and development for Intel Corp., credits the Japanese with consistently setting the standards for quality, standards that U.S. chip makers follow but don't transcend. "A lot of people in this industry get confused by thinking that quality is just about products—that's Little Q," Evans said. "They think about product characteristics rather than using words like 'delight,' 'anticipation,' 'predictability.' We don't consider that as part of quality, but the Japanese do."

Evans, a Baldrige Award examiner, has closely studied the Japanese chip makers and cited Hitachi, NEC, Fujitsu and Toshiba for their attention to detail, their discipline and their total approach to quality.

Ironically, Intel is addressing such issues itself. Its 386 and 486 microprocessors, for example, are selling

Texas Instruments began its formal quality program in 1982, long before the Malcolm Baldrige National Quality Award set everyone off on the quality chase. TI's Total Quality Through Customer Satisfaction program targets every nook and cranny of the organization. Managers go around handing out little blue cards touting the TI quality mission.

Quality mania at TI isn't about buzzwords or bandwagons, it is about survival, according to John W. White, president of TI's information technology group. "Quality is a business necessity," White said. That may be an understatement for a company in the volatile semiconductor industry, in which the U.S. sector has continuously lost market share to the Japanese over the past decade.

TI Semiconductor has already reaped some big rewards from its quality

efforts. The company's Hiji plant in Japan won that country's prestigious Deming Prize in 1985, and it recently pulled in top quality awards in both Malaysia and Taiwan. Since 1982, TI Semiconductor has won more than 240 formal awards for quality from suppliers and other organizations.

Daniel Klesken, vice president and senior semiconductor analyst at Prudential Securities Inc., noted that TI has made dramatic strides in quality in its dynamic RAM chip



JOHN W. WHITE: *In so volatile an industry, "quality is a business necessity."*

product over the past decade. "Ten years ago, the Japanese outstripped U.S. companies in DRAM quality by 10-to-1," Klesken said. "Today, TI is delivering a quality product with quality service. They've closed the gap."

According to White, technology has been a major contributor to the quality quest. Everything from CAD to automated management of orders, process control and communications is "essential and vital to meeting business needs," he said. TI installed a global network in 1973 to hook together its European, Far East and U.S. operations. Over the years, that network has been upgraded to include nearly 70,000 networked workstations and PCs, 3,300 minicomputers and 23 mainframes.

Technology, White said, has dramatically advanced miniaturization, packaging, process automation and circuit speed. It is also having a tremendous impact on the product-development cycle. The semiconductor division uses the network to provide instant access to share design, simulation and manufacturing data at any workstation. And TI is also implementing EDI links with its suppliers and customers.

—G. Rifkin

Quality Leaders in Electronic Devices

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Analog Devices Inc. Norwood, Mass.	\$485 M	Gregory F. McHugh Dir./Information Services	Top-rated by users for technology, product quality, support
Cypress Semiconductor Corp. San Jose, Calif.	\$225 M	Rick Foreman Dir./Strategic Systems & Admin.	Rapid growth in high-speed memory devices, logic and processors
Fujitsu Ltd.* San Diego	\$1.5 B for Fujitsu America Inc.	Fran Moynihan VP/Sales & Operations	Strong IS support in quality assurance
Hitachi Tokyo			A leading-edge quality performer
Intel Corp. Santa Clara, Calif.		Neal A. Franking VP/Dir. Corporate IS	A manufacturing powerhouse, especially of 386 and 486 chips
Motorola Inc. Schaumburg, Ill.	\$10.8 B	Les Shroyer Corp. VP/Dir. MIS & Telecommunications	Six Sigma defect goals; tightly integrated CAD and CIM processes
National Semiconductor Santa Clara, Calif.	\$1.67 B	Pat O'Haren VP/MIS	Excellent performance by new business units in wake of reorganization
NEC Corp. Tokyo			Attention to detail; disciplined, top-to-bottom quality approach
Texas Instruments Inc. Dallas	\$6.6 B	Ralph J. Szygenda VP/Information Technology Group	Quality effort helped capture DRAM market share from Japanese
Toshiba Corp. Tokyo	\$31.03 B	Koji Okamoto Gen. Mgr./Total Information & Systems Division	Exhibits the commitment to quality typical of Japanese suppliers

*Data supplied applies to U.S. subsidiary only

so fast that the company can barely keep up with demand. Though its product quality is sound ("You can't have a \$50 billion PC industry depending on you if your chips aren't of the highest quality," Klesken said), Intel has been accused of arrogance by many in the industry. Evans concedes that Intel has focused too much on "the Little Q. You get spoiled by people standing in line for your product."

Intel has an internal program designed to reduce the "arrogance factor" to zero, Evans said. "American companies used to be reactive when it came to quality issues," he added. "Now we are more preventative. The Japanese are beyond that, into the proactive stage."

Said John W. White, president of the information technology group at Texas Instruments (see related story, Page 63), "The U.S. has been losing market share for the last several years. We're trying to retain our position, and quality is key. IS, along with process automation and design automation systems, is right at the core of being able to provide top quality products."

At Motorola, the "Six Sigma" program, aimed at attaining 3.4 defects

"American companies used to be reactive when it came to quality issues. Now we are more preventative. The Japanese are beyond that, into the proactive stage."

—Warren Evans

per million parts in every process in the company, has already paid off. Motorola has saved a reported \$1.5 billion due to quality improvements since it embarked on the program in 1987. The company's IS group has seen dramatic results from Six Sigma, according to Les Shroyer, corporate vice president and director of MIS and telecommunications.

Shroyer pointed out that Motorola's semiconductor business is greatly affected by information flow. A particular chip may have had its origins in one part of the world, its packaging and encapsulation in another, its final testing in another, and it may be sold

somewhere else. "A device that may sell for a few cents may travel 30,000 miles before landing at its customer's dock," Shroyer said. "It takes very sophisticated computer-integrated manufacturing and IS techniques to control and coordinate all of that product movement."

Shroyer said that Motorola, with 2,500 IS professionals across its various business units, is tightly integrating its CIM, logistics, shipping, application of statistical process control on the factory floor and monitoring of control processes. IS also plays a critical role in integrated circuit design, where "some fairly exotic CAD processes go on. All this places great demand on IS," Shroyer said.

Most important, according to Shroyer, is the communications network. "We are trying to figure out how to be a large company and still have the reflexes and sensitivity of a small company," Shroyer said. "To do that, people have to communicate extraordinarily well." □

Glenn Rifkin, a freelance writer based in Sudbury, Mass., is co-author of The Ultimate Entrepreneur: The Story of Ken Olsen and Digital Equipment Corp.

“If we wish to support a Soviet leader whose policies appeal to us, we should look more closely at Boris Yeltsin.”

Caspar Weinberger
Forbes, August 6, 1990

“Remaining President of the U.S.S.R., Gorbachev will have purely nominal and ceremonial functions, not unlike those of the Queen of England.”

Vladimir Kvint
Forbes, September 3, 1990

“Gorbachev is still a prisoner of his past, unable to truly break with the communist orthodoxy of an all-powerful central government.”

Malcolm S. Forbes, Jr.
Forbes, December 24, 1990

“Gorbachev will most likely have to listen to the money-grubbing pleadings of his generals in order to stay in power.”

Peter Fuhrman
Forbes, April 1, 1991

While the world has changed its opinion on Gorbachev, we haven't.

When others saw Gorbachev as a man who could single-handedly bring about democratic changes in the U.S.S.R., Forbes saw him for what he was. A dictator. As early as last year, we predicted that he would use KGB security forces to re-establish the Kremlin's crumbling authority. And that a bloody confrontation would start in the Baltics.

Long before anybody else, Forbes pointed out that continued support for Gorbachev would have disastrous consequences. History is proving us right. Russia is on the verge of economic and political disintegration.

Who should the U.S. support? Now, of course, everyone's jumping on Boris Yeltsin's bandwagon. But

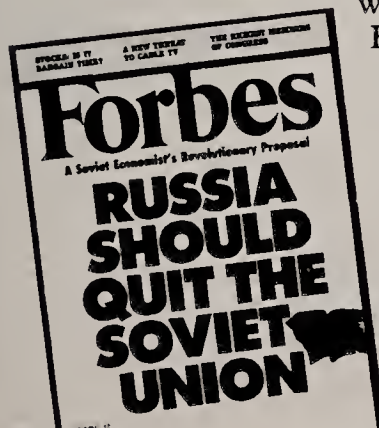
Forbes singled out the Russian maverick as early as last year. When others were still unsure of Yeltsin, Forbes saw him as a serious alternative to communism and harsh repression.

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HEALTH CARE

VITAL SIGNS

Computers are moving out of billing offices and into examining rooms, where they are helping care givers with prevention, diagnosis and research

With most products and services, high-quality materials and processes lead to high-quality results. When the raw materials are human beings in various states of disrepair, however, it's more difficult to rely on pat systems to achieve quality outcomes. That's what makes the quest for quality in health care unique. High-quality health care

requires art and science in equal parts. Specifically, it requires superior clinicians, superior technology and the ability to use both in innovative ways.

A good example of this mix is found at Beth Israel Hospital in Boston. A major teaching hospital of Harvard Medical School, Beth Israel is a private, not-for-profit, 505-bed community hospital, distinguished, say medical students, by the dedication of its nurses and the clinical orientation of its computers.

"We have primary nursing, where one nurse follows a single patient through the hospital course and, if possible, again if the patient comes back," said Dr. Howard Bleich, associate physician and co-president of

the Center for Clinical Computing at Harvard Medical School. "There is enormous dedication."

On the technology side, Bleich said, "computers are an important component because quality of care depends on up-to-date, accurate information." Specifically, patients' entire medical records are available on any of 800 terminals. Information goes online in real time, either directly from lab instruments in the case of test reports, or by immediate transcription.

Physicians and nurses can use the terminals to help decide how to deal with particular ailments by calling up the case histories of patients who have already been treated for them. The National Library of Medicine's MedLine database of medical literature is also online. Care givers use the system heavily, posting about 65,000 queries a week.

HONOR ROLL

Beth Israel Hospital

Cleveland Clinic
Foundation

HCA West Paces Ferry
Hospital

Harvard Community
Health Plan

Henry Ford Hospital
System

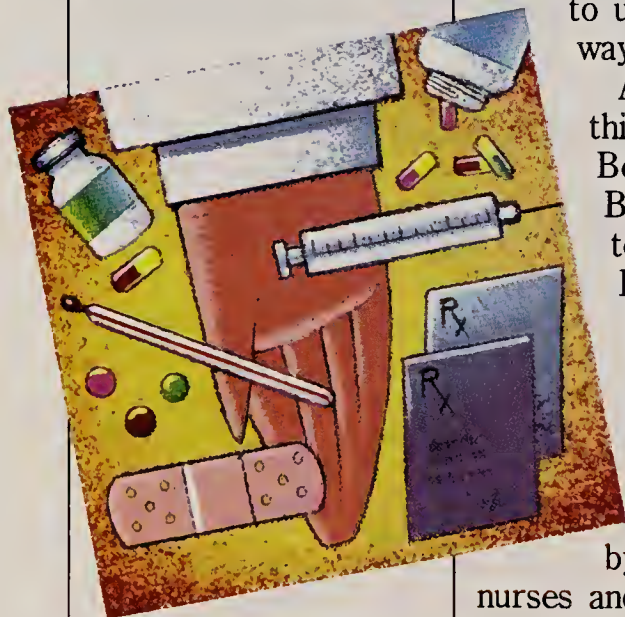
Intermountain Health
Care System

Mayo Foundation

Ochsner Medical
Institutions

Rush-Presbyterian-
St. Luke's Medical
Center

University of Michigan
Hospital



BY KATHLEEN MELYMUKA

Making Electronic Rounds

A similar system at Ochsner Medical Institutions in New Orleans uses a wide area fiber-optic network to link patient records at the hospital and clinic with those at two regional and nine neighborhood clinics. While the records are not updated in real time, they include administrative and demographic data as well as clinical information, all automatically fed from interfacing systems.

The database supports quality in both individual patient care and medical research. "We can inquire by patient and see their records historically, or we can look across patient populations," explained James F. Roberts, vice president and director of information systems. "We can search the database and pull out all the female population between x and y age with a certain condition who lived so many years after [a given] treatment. That gives [us] the ability to check a treatment over a wide population base and improve it."

Roberts sees electronic communication as an immensely important tool for the proliferation of high quality medical care. "I foresee the day when different hospitals talk to each others' computers and share information so you can get a bigger sampling of treatments and outcomes."

On the administrative side, Ochsner is picking up on methods already adopted by other industries. "Rather than stock materials, we're using a just-in-time system and ordering per schedule," Roberts said.

"The movement in health care right now is toward continuous quality improvement [CQI] or total quality management," said Sandy Metzler, director of the division of quality control management for the American Hospital Association in Chicago. Over the past few years there's been a movement from traditional quality assurance to CQI/TQM, she said, explaining that while traditional quality assurance focuses on outcomes and individuals, TQM looks at the whole process of patient care.

"The theory is that all people want to do a good job, but systems go wrong someplace along the way," Metzler said. TQM "assumes that

Intermountain Health Care, a not-for-profit system of 24 hospitals in Utah and Arizona, is regarded as a model in the use of information systems to support a total quality program.

"Despite all the talk about managed care, almost no one has managed care," said Dr. Brent C. James, executive director of the Intermountain Health Care Institute for Health Care Delivery Research. "In our quality improvement effort, we've tried to . . . understand the processes and outcomes of care across the continuum and devise an information system so we can begin to rigorously manage the care we deliver."

Information systems are critical in tracking not only outcomes, but processes of care to pinpoint problems when outcomes are bad, he said. "At the heart of the whole thing is the need for an infrastructure to provide the

right data at the right time, analyzed in the right way so you can make good clinical decisions."

At Intermountain's flagship operation, LDS Hospital in Salt Lake City, a clinical management system called Help, developed in-house, features the complete medical record for each patient as well as lab reports and pharmacy activity. Data is entered in real time: Nurses key in notes at bedside terminals and lab instruments transmit results directly to a PC. Help



DR. BRENT C. JAMES: "We don't try to limit physicians' choices."

uses an expert system-based clinical information system that designates the treatment of choice based on the patient's condition. Help also creates an alert notice if a prescribed medication or treatment could be dangerous to a particular patient. "A traditional pharmacy system will check for [dangerous] drug interaction," said James. "Help also checks over 100 parameters—the patient's entire record—[before] a drug is given."

Physicians can deviate from the treatments suggested by Help, but they are asked to explain what's wrong with Help's advice so the system can be improved. "We don't try to limit their choices," said James. "They use it because they're convinced it works." Because Help results in highly controlled treatment, the system facilitates clinical trials, leading to continuous improvement of care—the goal of the total quality program.

Help is being installed at all 24 hospitals in the Intermountain system in a \$50 million project over seven years. "Physicians first find it very threatening," James admitted. "They're afraid of being trapped by cookbook medicine. But very soon they find it handles the scut work for them and they're not trapped at all. They quickly become addicted to it." —K. Melymuka

Quality Leaders in Health Care

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Beth Israel Hospital Boston	\$285 M	Robert F. Messier Dir./MIS	Patient-oriented, fast, efficient; heavy user of IS
Cleveland Clinic Foundation Cleveland	\$660 M	Michael L. Jones Chairman/Medical IS	All specialties and subspecialties under one roof; extensive interdisciplinary consultation
HCA West Paces Ferry Hospital Atlanta	\$1.14 M	Earnest Luttrell Administrative VP/CIO	Advanced and energetic community hospital; leader in CQI
Harvard Community Health Plan Brookline, Mass.	\$800 M	James C. Lewis VP & CIO	Uses quality initiative based on Motorola model; thoughtful, tiered approach to training
Henry Ford Hospital System Detroit	\$1.2 B	Albert A. Sinni Jr. System VP	Leader in TQM; quality techniques exported to many peers; specialty is meeting challenge of indigent care
Intermountain Health Care System Salt Lake City		Larry D. Grandia VP/IS	CEO Brent James a guru of quality health care; extensive use of IS
Mayo Foundation Rochester, Minn.	\$1.18 M	Walter R. Menning Vice Chairman/IS	Known for testing new medical equipment and clinical research
Ochsner Medical Institutions New Orleans		James F. Roberts VP & Dir./IS	Doctor-centered; long-term patient feedback a priority; special interest in quality nursing
Rush-Presbyterian-St. Luke's Medical Center Chicago	\$660 M	Patricia Skarulis VP/IS	Site for 3M program in continuous quality improvement; strong educational programs; high-quality tertiary care
University of Michigan Hospital Ann Arbor, Mich.	\$500 M	Paul R. Vegoda CIO	Very comprehensive quality program; leader in clinical programs, administration, cost savings and training

everything can be improved, [but] it takes five to 10 years to go through this whole evolution." Information systems are critical to TQM, she said, because it requires the ability to trend data over time. "Hospitals have never been very good at managing their data resources," she said. "Now it's more paramount that they do so."

A look at the total quality program at Harvard Community Health Plan shows the crucial role of information systems. The Boston-area HMO is attempting to measure the quality of services in every area. "We got involved in the quality effort in 1987," said Matt Kelliher, corporate director of quality. "Information resources has given us excellent capabilities from a clinical and administrative viewpoint to identify areas for improvement and monitor [progress]."

Clinically, IS measures such data as the frequency with which members have health screenings, such as cholesterol tests. "We have automated medical records," said Kelliher. "We have a clinical reminder system so when a member sees a physician, the physician is informed of [which screenings] the member hasn't had and what he needs."

Typical administrative measurements include billing adjustments, membership terminations, the num-

ber of days it takes for customers to get a rate quotation and how often they must call claims service for a problem.

The newest quality effort at HCHP is an attempt to provide training in concurrent engineering to everyone involved in the design or development of new products, processes or systems. Based on Japanese design techniques, the training revolves around cross-functional development teams using identical language, methodology and tools. Kelliher thinks this approach has crucial implications for information services. "Many of the frustrations information services has experienced [such as user dissatisfaction, bugs and continuous fixes] can be addressed in these new techniques," he said. "But IS needs to view its role as collaborative, and it's never had to do that before."

Collaboration is key at Rush-Presbyterian-St. Luke's Medical Center in Chicago, a not-for-profit, 1,700-bed, three-hospital complex where IS puts employees on the line in a total quality effort. A roving band of IS employees called the Management Support Group helps departments study and improve their processes by teaching the use of such TQM tools as control charts.

At Rush, the pursuit of quality has

made the IS ghetto a thing of the past, and that is just one of many changes foreseen in health care technology. "Information services in health care has not been terribly forward thinking," said Patricia Castel Skarulis, vice president of information services and CIO. "We have been driven by financial data, [but] quality will define the issues for us in the '90s. That will be the area in which we all compete."

"Computing has been primarily financial," Beth Israel's Bleich agreed. "In most hospitals the computing that could help in the practice of medicine has tended to be neglected. I think with time that's where the major changes will happen."

The use of information systems to improve clinical quality in health care is a relatively new idea, as is TQM in a health-care setting. Experts say that their impact on quality will be felt later in the decade. But while changing technology and methodology are improving quality, practitioners stress that the backbone of health care will never change. Said Bleich, "There's no substitute for smart people of good will doing the best they can." □

Kathleen Melymuka is a freelance writer based in Duxbury, Mass.



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When Giants Learn to Dance: Mastering the Challenges of Strategy, Management and Careers in the 1990s; Dr. Martin Feldstein, former Chairman of the Council of Economic Advisors and Professor of Economics at Harvard; Dr. Paul Kennedy, Dilworth Professor of History at Yale University and author of the best-selling *The Rise and Fall of the Great Powers*; and Dr. James Wetherbe, Director of MIS Research at the University of Minnesota as well as author of 14 books and countless articles on the effects of technological change.

Together, these speakers will address business trends, global economies, world events and technology – key issues that will influence your world now and in the years ahead. And, *CIO Magazine* Publisher Joseph L. Levy will focus on "The CIO's Expanding Role Through the 1990s and

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HOSPITALITY

TAKING THE GUESSWORK OUT OF GUEST WORK

IT can help hospitality providers maintain quality control and track customer preferences. But front-line employees are the real measure of service.

When you eat at a restaurant you are buying food, and when you stay at a hotel you are buying a room for the night. But in either case, your satisfaction with the product largely depends on how it is delivered. Few industries compete as fiercely as the hospitality industry on the quality of service provided by employees. These companies are looking anywhere they can for an edge, and—at least where hotels are concerned—that includes information technology.

Although the line sometimes blurs between the hotel and restaurant businesses—Marriott, for example, is a large catering and restaurant company in addition to its better-known line of work—the two are quite different in the ways in which quality is assessed and achieved. Service is critical in restaurants, but the single most im-

portant element in quality is generally considered to be the food itself. Whatever else it gets right, a restaurant that offers stale, erratically prepared items from an unappealing menu is unlikely to stand out as a quality organization.

Most of the judges in this category picked relatively high-priced restaurants as best exemplifying food and service quality. However, since most such restaurants are individual establishments rather than widespread franchises—is there a Quilted Giraffe on your block?—the fine dining votes were spread thin, and only fast-food chains made the list.

But, say what you want, no

HONOR ROLL

Au Bon Pain

Domino's Pizza

Four Seasons Hotels
and Resorts

Hampton Inns Inc.

Hyatt Hotels Corp.

Marriott Corp.
(including Fairfield Inn
and Courtyard)

McDonald's Corp.

Regent International
Hotels

Stouffer Hotels and
Resorts

Walt Disney Co.



BY DAVID FREEDMAN

The CRS Red Carpet

one is offering any apologies for including McDonald's on a list of quality organizations. Judges were almost unanimous in crediting the burger vendor not only with leading the fast-food industry in quality, but with defining quality standards for the business. The quality of McDonald's ingredients and the consistency of preparation were singled out for praise, thanks to what one judge called "brilliantly engineered quality processes."

Also mentioned were aggressive employee hiring and training programs that keep things running in a relatively friendly and efficient fashion, points lacking in many restaurants in all price ranges.

Nobody raved about the pizza at Domino's, but the company made the list because its guaranteed fast-delivery program creates customer satisfaction. Au Bon Pain, a French bakery and sandwich chain, was singled out for its remarkable ability to keep outlets stocked with fresh, authentic-tasting croissants and other highly perishable, difficult-to-get-right baked goods. "I always buy their stuff at airports, and I don't even like crow-sants," gushed one judge.

How does IT impact quality in restaurants? It doesn't, really, agreed most judges, since the most influential factors are generally simple and low on information content. One exception: Au Bon Pain, which has set up an inventory and distribution system tied to point-of-sale machines that ensures rapid delivery of the right ingredients and baked goods to stores just when they need them.

Although they haven't achieved much acceptance, a few applications spawned by the restaurant industry may be worth noting: computerized, interactive training programs for counter help; hand-held waiter keypads that can be plugged into a workstation for relaying orders to the kitchen; computerized wine lists; and systems that automatically track reservations and assign tables.

In the hotel industry, on the other hand, quality is based on intangible elements. (Go ahead—try to define the "Disney Magic" to which every

If you call Stouffer's central reservation system, have your pen ready: The reservationist will be able to tell you, for any of the chain's U.S. hotels, how to get there, what it offers by way of pool, health club and other facilities, where you can go in your spare time, and just about anything else you might want to know. If you're a participant in the company's frequent-guest program, you won't have to specify the kind of room you'd prefer, because it's already up on the reservationist's screen. If you do request information that isn't on the screen, don't be surprised if the answer is waiting the next time you call. "I keep track of how often our agents have to say, 'I'm sorry, I don't know,'" explained Debra Kristopson, MIS director for the Solon, Ohio-based company.

Kristopson calls the 3-year-old, workstation-based reservation system "the crown jewel" of her department's efforts. But the company's other



DEBRA KRISTOPSON calls Stouffer's reservation system "the crown jewel" of IS.

customer-service-oriented systems aren't chopped liver, either. Every single comment card filled out by a customer is immediately entered into a system that is part of an industry-award-winning guest relations department. The system also notes the response of that hotel's general manager, who is required to send a personal letter to the customer within 36 hours regardless of the nature of the comment, and tracks how many complaints were addressed; this information

will be used to determine that manager's annual bonus.

Even billing is accomplished with a zealous eye to quality. When a *single customer* complained that her group's bill was difficult to understand, Kristopson met with marketing and accounting managers and had the billing system revamped to provide groups with an easier-to-read bill—which is now sent along with a box of candy. "We haven't heard that particular complaint again," she noted.

Kristopson credits a nonhierarchical culture pervaded by an obsession with customer service for her department's ability to support quality. She attends all officers' board meetings, in which time is spent brainstorming on ways to improve quality. On the more technical side, Kristopson has shifted development priorities so that 60 percent of a project's dollar investment is poured up front into the design, brought in a quality assurance team and converted the data center into a fully automated, lights-out operation. "How can we convince our users that automation can help them if we can't help ourselves?" she pointed out.

—D. Freedman

Open systems.



Everyone agrees they're

No one's debating whether open systems are a good idea, but you'll hear plenty of discussion about what open systems *are*.

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Good, but not everyone agrees how to get there.

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Quality Leaders in Hospitality

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Au Bon Pain Boston	\$60 M	Mark Factor Dir./MIS	Uses IT to ensure rapid delivery of fresh ingredients and baked goods
Domino's Pizza Ann Arbor, Mich.	\$2.65 B	Ken Herr National Dir. IS	Prompt delivery meets major customer need
Four Seasons Hotels and Resorts Toronto	\$164 M	Dan McTavish Dir./IS	Sets the standard in luxury hotels
Hampton Inns Inc. Memphis, Tenn.		Christopher Gibbons VP/Information Technology Services	Gets the basics right at a low price
Hyatt Hotels Corp. Chicago	\$200 M	John Biggs Sr. VP	Innovative management gets out to meet customers
Marriott Corp. (including Fairfield Inn and Courtyard) Washington			Consistent quality across range of price categories; formal quality control programs
McDonald's Corp. Oak Brook, Ill.	\$18.7 B	Carl F. Dill Jr. VP/IS	Defined product and service standards in fast food; quality ingredients; consistent preparation
Regent International Hotels Hong Kong			Superb service with lots of extra touches
Stouffer Hotels and Resorts Solon, Ohio		Debra Kristopson Dir./MIS	Management focused on quality programs; industry-award-winning guest relations department
Walt Disney Co. Burbank, Calif.	\$6 B	Sharon D. Garrett CIO	Maintains charming environment, good food service

judge referred.) Physical facilities and location are obviously important, allowing new properties, such as those Marriott is building under the "Courtyard" name, to address customer needs through hotel design. But once a hotel is built, it is competing on price and service.

Customers have vastly different expectations of service depending upon price category. In the budget category, they want a clean room and no hassles. (No under-\$40-a-night hotels made the list, though Super 8 Motels was singled out for praise by a few judges.) But luxury hotels must get every detail right, from the tip of the porter's hat to the absence of cigarette butts in the elevator ashtray, while finding new ways to surprise guests with unexpected service touches. Four Seasons won the judges' acclaim in this regard, but a few noted that some Asia-based chains are making inroads in the U.S. market.

The real locus of quality competition is in the mid-range category, where acquisition-fed megachains such as Hyatt and Marriott are battling to provide increasingly higher levels of service. These hotels use different approaches. Marriott has set up formal quality-control pro-

grams that it rigorously imposes on every property, including its lower-priced Courtyard and Fairfield Inn chains. Hyatt, on the other hand, has taken a more flexible approach that encourages local managers to come up with their own techniques for addressing quality concerns. Both chains, along with most others in this price range, depend on IT to help implement their quality efforts.

Yield-management systems have received a lot of attention, but such systems address profitability concerns, not quality. Reservation systems are another matter. They are the front line in the customer's contact with the hotel; if the reservationist can't quickly provide all the information today's increasingly fussy traveler is looking for, the hotel probably won't have the opportunity to impress that customer with its deep-pile bath towels. Stouffer's reservation system was mentioned as a stand-out (see related story, Page 71).

Frequent-guest programs are important too—not only for the free-stay incentives they offer, but also for the resulting database of customer preferences. Said one judge, "When a hotel knows what kind of flowers you like in your room, they've got you locked up." In addition, a

number of hotels have automated their customer feedback systems, allowing them to track every sort of complaint by type, property and relevant employee. Increasingly, manager and employee compensation is being tied to the reports generated by these systems. These hotels are determined to use systems to make sure that nothing, no matter how small, slips between the cracks.

Ironically, a few judges noted that while hotels are increasing their dependence on IT to achieve quality, many are discovering that customers prefer to be isolated from the technology. In-room video checkout systems, for example, haven't really caught on with guests, and some hotels are hiding their front desk display terminals under a glass counter so that clerks can continue to address customers face-to-face while checking them in. Perhaps more to the point, one judge noted that in an employee-service-oriented business, technology can only accomplish so much. "Everything falls down," he said, "when the customer ends up dealing with an employee who woke up in a grumpy mood." ☐

David Freedman is a freelance writer based in Brookline, Mass.

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PHARMACEUTICALS

THE BEST MEDICINE

Drug companies have always manufactured a high-quality product. Now some are using IT to cut the lengthy development and approval process.

“We’re not making cookies; we’re making products that impact the well-being of people,” said Bob Lyons, vice president of corporate information services at Schering-Plough. “Lack of quality could have a devastating impact.” Luckily, lack of quality is really not an issue in pharmaceuticals. “You don’t get sloppy and stay in business,”

said Les Clark, vice president of information systems at Marion Merrell Dow.

The pharmaceuticals industry was obsessed with quality long before it became Job One elsewhere. Besides approving the release of drugs, the Food and Drug Administration audits and approves the quality of manufacturing processes, explained Burleigh Cook, corporate vice president of corporate information services at Syntex. “Long before quality was such a nifty thing to do, pharmaceuticals had to demonstrate quality of their processes to an outside agency,” he said.

That history gives the pharmaceuticals industry a degree of consumer trust that may be unsurpassed. Ironically, this

obsession with product quality has kept most companies from committing to the kind of total quality improvement effort transforming other industries.

“There’s a big difference between Little Q and Big Q,” said Skip Irving, director of the health care practice at Arthur D. Little Inc., the Cambridge, Mass., consulting firm. “Little Q is what the FDA looks for: a standard for quality of products. You can build that in and inspect that in. But when you talk about TQM [total quality management], that’s Big Q: a real commitment to employees, to customers, to shareholders of the company . . . The problem with pharmaceuticals is that very few have committed to the Big Q.”

Industry insiders agree. “There aren’t too many that are far along on total quality programs,” said Janet L. Benvenuti, a Baldrige examiner and

HONOR ROLL

Abbott Laboratories

Bristol-Myers Squibb
Pharmaceutical Group

Eli Lilly and Co.

Glaxo Holdings PLC

Johnson & Johnson

Marion Merrell Dow Inc.

Merck & Co. Inc.

Pfizer

Schering-Plough Corp.

Syntex Corp.



BY KATHLEEN MELYMUKA

The Cray Cure

director of quality and productivity for Bristol-Meyers Squibb.

"Most companies that got into total quality did so because they were losing market share or the quality of their products was declining," Benvenuti explained. "Pharmaceuticals were not in trouble." As a result, she said, "there's some question in the industry about whether you need a total quality effort."

At Schering-Plough, for example, "The quest for quality is independent within each of the functional areas," said Lyons, "but it's always a mainstream idea that's disseminated throughout the company from senior management." Similarly, Merck has never had a total quality effort, but it remains the most respected of all pharmaceuticals makers. "They have an excellent management style, a strong culture," said Arthur D. Little's Irving. "They're perceived as a little arrogant, but they're respected."

One of the few pharmaceuticals makers to have begun a TQM program is Marion Merrell Dow. "Total quality management is something we're moving into," said Clark. "From our standpoint as a new company [the result of a 1989 merger of Merrell Dow, a subsidiary of Dow Chemical, and Marion Laboratories], it's real important to get that built into the subculture and make it a way of life: the idea that people need to look for continuous measurable improvements in everything they do, especially as regards the external customer and the patients we serve."

Clark thinks the total quality movement will revive some long-forgotten IS skills. "Over the last six or seven years IS has become requirements-driven," he said. "That has hurt us."

"In this setting you have to define what you do, establish facts, get back to the old systems-analysis approach. IS will play an instrumental role in [determining] what systems and processes really do from a total systems standpoint," he added.

With or without TQM, the top priority in pharmaceuticals is quality assurance, and you can't assure quality without IT. At Schering-Plough, automation lets the company do the

You make 10,000 compounds to get one to market," said William Reid, director of scientific information services for Eli Lilly. "It takes an average of \$250 million and seven to 10 years to get one product to market. The odds are terrible."

In the pharmaceuticals industry, competition is played out in areas such as product development and speed to market. And Eli Lilly and Co., the Indianapolis-based producer of such breakthrough drugs as human insulin, takes competition seriously. Lilly recently upped the development ante by becoming the first pharmaceuticals maker to enlist a supercomputer in its development effort.

The Cray-2 uses mathematical modeling to discover new chemicals. "Scientists use it to 'create' a molecule that doesn't exist and investigate it to see if it's worthwhile to make," Reid explained. "That allows us to cut

down the numbers of molecules we actually send to labs so that those we send have a better chance to make it. With the Cray, you can work a hundred times faster than you can on a regular computer."

The Cray is part of Lilly's long tradition of using IS to support quality. "We have an ethical responsibility to be sure products work," said Reid. "Quality assurance systems were among the earliest systems to be automated at Lilly. There's no way to



WILLIAM REID: "Computing systems don't discover drugs—people do."

keep track of all the data related to quality without computer systems."

Systems support every step in product development, from the theoretical work of the Cray to the concrete testing of vendor raw materials to analysis of products in development. Even after products have gone to market, systems continually test and compare the shelf lives of samples from each lot.

Although technology is crucial, the keystone of Lilly's success is its employees. "People stay here for their whole careers," Reid explained. "We don't lay people off, [which] means that we have to retrain people in new technologies. . . . Now we have people that know how to use a Cray when they used to use an IBM PC."

Innovative products are also critical to business success. Reid cited Lilly's development of human insulin, the first marketed product from recombinant DNA technology. "Computing systems don't discover drugs—people do," he said. "But systems have to be right behind the scientific approaches to make them come together."

—K. Melymuka

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Quality Leaders in Pharmaceuticals

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Abbott Laboratories Chicago	\$6 B		Excellence in management, production and products; commitment to customers; zero defects; quality training programs
Bristol-Myers Squibb Pharmaceutical Group Princeton, N.J.	\$5.3 B	Keith N. Kebel VP/Information Services	Trailblazing research in patient response to drugs; high commitment to customers, including AIDS and cancer patients
Eli Lilly and Co. Indianapolis	\$5 B		Total quality program and strong commitment from management; superior production; good communication with customers
Glaxo Holdings PLC London	\$5 B	D.C.B. Horne Group IT Controller	Committed to customers and employees; rapid U.S. growth; progressive in dealing with changing health care environment
Johnson & Johnson New Brunswick, N.J.	\$11 B		Excellent communication with customers and employees; highly empowered work force
Marion Merrell Dow Inc. Kansas City, Mo.	\$2.4 B	N. Les Clark VP/IS	The result of a merger: Marion brings quality operation, management, commitment to employees and customers; Merrell Dow brings commitment to stockholders
Merck & Co. Inc. Rahway, N.J.	\$7.7 B	Albert C. Cinorre VP/Computer Resources	Excellent management style; strong corporate culture; high employee morale; heavy R&D, patient-education programs
Pfizer New York	\$6.4 B		Strong programs in research and patient education; well-coordinated marketing programs
Schering-Plough Corp. Madison, N.J.	\$3.4 B	R.S. Lyons VP/Corporate IS	Diversified company with excellent management throughout divisions and levels; strong leadership
Syntex Corp. Palo Alto, Calif.	\$1.5 B	Burleigh Cook Corp. VP/CIS	Zero defects; good internal and external communications

same thing 1,000 times a day efficiently, said Lyons. "In scientific research we're using it for drug evaluations, testing, matching components. Computers are taking on loads that used to take months and years, and shortening the time frame."

The second priority is speed to market, an issue whose importance has grown dramatically since the emergence of AIDS. But before you can speed a product to market you have to develop it. Pharmaceuticals development has been compared with drilling for oil in terms of the number of false starts and dead ends for each success, but IT can improve the odds. "We're looking at ways to provide more powerful tools to scientists for better visualization and interpretation of molecules so they can minimize experiments and zero in on [what is] most promising," said John T. McGee, vice president of international information technology at Glaxo Holdings PLC. "We're beginning to offer computerized solutions [in place of] physical experimentation: graphical interpretations of molecules and models rather than actual tests. Through visualization you can take analysis to a much greater de-

gree of specificity earlier in the process."

A technology called CANDAs or CINDAs (computer-aided/computer-integrated new drug applications) is being used widely in an attempt to cut time from the long and laboratory-intensive FDA approval process. "Everyone's experimenting with the use of technology in clinical trials and in interacting with the FDA," said Schering-Plough's Lyons. "We're experimenting with imaging technology and optical disk [to see whether we can] communicate with the FDA without sending reams of paper back and forth." At Glaxo, IT is shortening time to market by providing a common framework for clinical trials worldwide. "It's important in clinical trials processing to look at more standardization so trials conducted in the U.K., U.S., France or Japan will all adhere to the same rigid standards," said McGee.

Increasing pressure to bring products to market faster will continue to boost the use of IS, said Lyons. "There's growing unrest among the public concerning products in test that might help people who are dying of AIDS or cancer," he said. "Phar-

maceuticals already rely extensively on information systems, but that will grow dramatically."

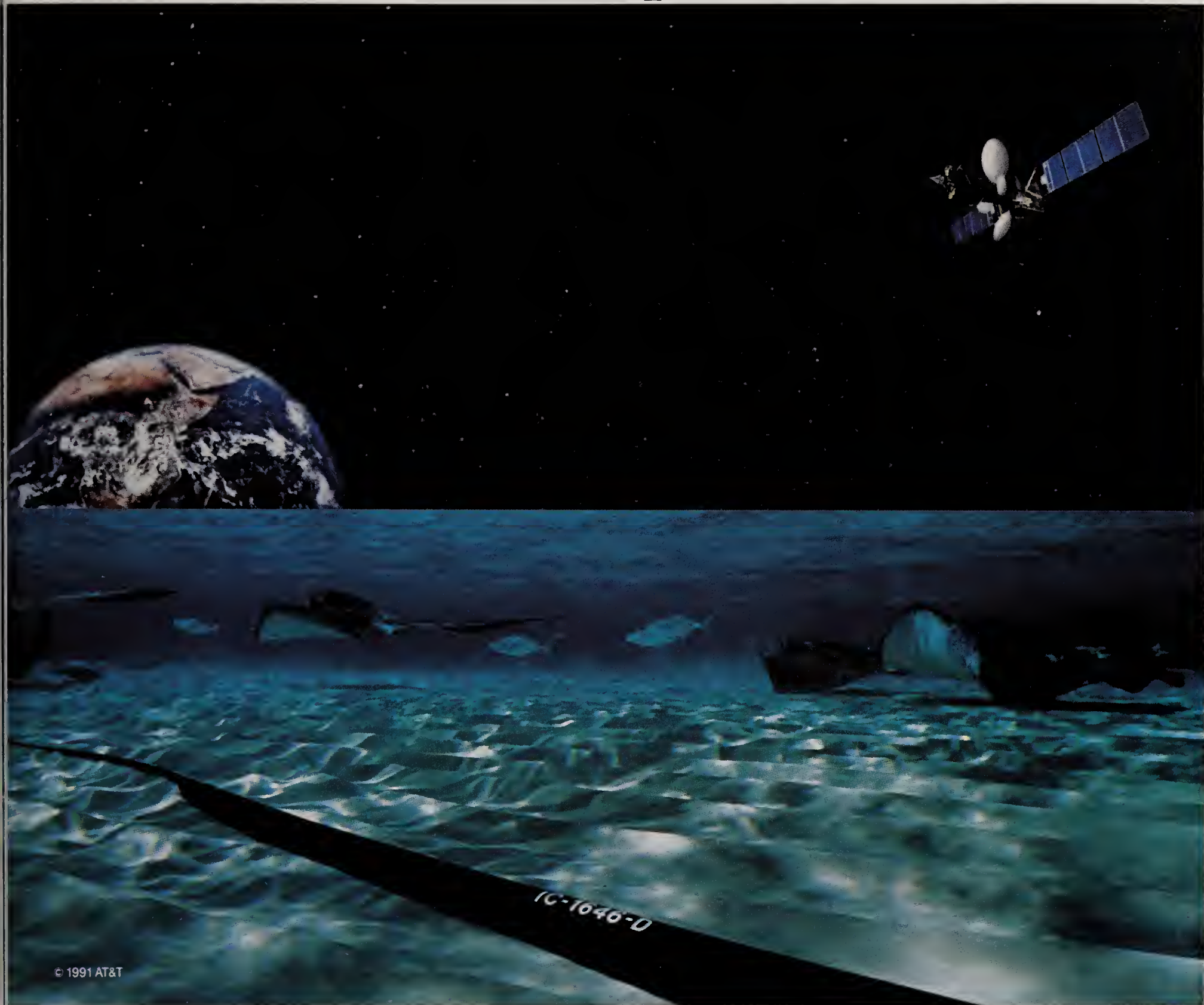
Once products are approved, technology can enhance the quality of marketing and sales efforts. Schering-Plough is using IT to help analyze market information and develop marketing strategies. "We're going beyond the physician channel to the sophisticated consumer," said Lyons.

Finally, Marion Merrell Dow is continuing a large investment in sales force technology, including electronic customer profiles to focus its efforts on high-volume customers.

Only through technology can pharmaceuticals makers assure the level of quality in products and processes that they need to compete. But beyond the requirement for quality is an understanding that quality makes sense. "Quality can reduce cost by streamlining operations," said Lyons. "Quality means evaluating processes in terms of doing it the best way the first time around. Quality is not an extra cost of doing business; it's a better way of doing business." □

Kathleen Melymuka is a freelance writer based in Duxbury, Mass.

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TRANSPORTATION

MOVERS AND SHAKERS

Carrier services turn to customized products, streamlined reservation systems and intermodal transport now that being on time is no longer enough

In the transportation industry, a passenger can look very much like a package: Both need to get where they're going on time, for a reasonable price and in one piece. Airlines and transport companies have had mixed success in this endeavor over the years. While trying to improve their efficiency, they have fought to adapt their prices and services to a more competitive, deregulated industry. Amid this struggle they have still looked for ways to differentiate the quality of what is essentially a commodity service, and have found a lot of unbroken ground in the area of customer service.

"If I've got a package and I want it to go from one place to another, I don't care what kind of truck or plane it rides on," said an industry consultant. "But a commodity service

is quickly transformed into something more interesting when you introduce issues of speed, timeliness, convenience and real-time tracking.

"One thing customers want is the intangible of confidence," he continued. "When I give something to Federal Express,

I can forget about it because I have complete confidence that it's going to be picked up and delivered when it's supposed to be, and will arrive in good shape. But that performance always has to be there. You can do that for three years, and then the day you don't, you're a bum."

For passenger airlines, performance is often measured in terms of on-time service. But bad publicity has moved many airlines to pad their flight times to achieve better—albeit less meaningful—performance records. "I haven't been on a late flight in six months because they extend their flight times out so far they land 20 minutes early," said one Wall Street analyst. With this in mind, industry experts tend to regard in-flight service (from meals to the courteousness of the flight crew) and the ease with which

HONOR ROLL

ABF Freight System Inc.

Alaska Airlines Inc.

American Airlines Inc.

American President Companies Ltd.

Carolina Freight Corp.

Conrail (Consolidated Rail Corp.)

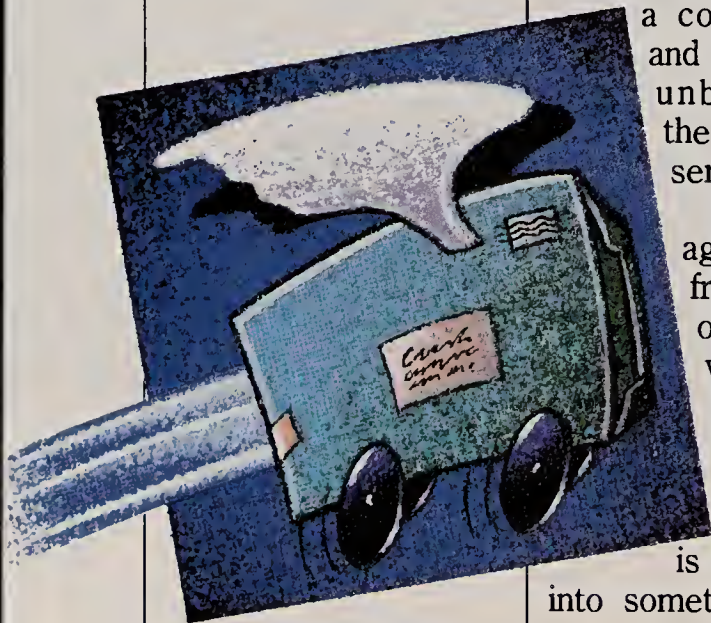
Federal Express Corp.

Grand Trunk Western Railroad

Union Pacific Railroad

United Airlines

BY MEGHAN O'LEARY



Poetry in Locomotion

customers can make reservations as the best measures of quality. Most experts agree that the U.S. air industry is well behind European and Pacific Rim carriers in service, but they expect the imminent deregulation imposed by the European Economic Community to throw that industry into a competitive turmoil and bring the level of service down.

Like an airline, a good shipping company promises to deliver a product intact at a certain time; but freight carriers have had to develop a broader array of quality measures in order to meet the varied needs of their customers. Better on-time delivery, product customization, intermodal transport and partnerships with customers are all avenues that carriers are exploring in order to cement relationships with their customers. As part of its customization efforts, for example, Conrail offers its steel-producing customers more frequent, smaller deliveries that allow the steel makers to support their manufacturing customers' JIT (just-in-time) activities. Conrail is one of a growing number of companies working with its customers to support JIT and quick-response activities.

Carriers have also increased their emphasis on broad-reaching, high-quality, point-to-point, intermodal service involving flexible, reliable transit times and frequent reporting. American President Companies is well-known for its intermodal transport network featuring ships, trains and trucks. Its international reach allows it to put together transport packages to meet any customer need and to be part of the customer's production process.

In many cases, such emphasis on service quality and breadth is a response to customers' desires to reduce the number of carriers they use, and to rely on one that knows their business intimately or can provide a range of services.

Information technology plays an essential supporting role in delivering a smooth, efficient transaction and gaining the confidence of customers. Among airlines, American is foremost in using technology to provide

One of the most rigorous tests of a transport company's service is a demanding customer. The auto industry in particular requires "premium" levels of service, according to Donald Gagen, assistant vice president of information and control systems for Grand Trunk Western Railroad in Detroit.

As a carrier of parts and finished cars for the auto industry, Grand Trunk has had to meet not only the basic challenge of on-time delivery, but also the task of supporting its customers' manufacturing processes with customized service and electronic links.

Although it is small in size, Grand Trunk's annual revenues of more than \$350 million make it one of fewer than a dozen Class One railroads in the country. Its success derives largely from such services as cargo tracking with real-time reporting, loading and delivery at the factory door, and EDI-based billing and reporting.



DONALD GAGEN: "We're so close to customers that we have developed unique services for them."

"We're so close to customers that we have developed a lot of unique services for them," Gagen said. Mazda, for example, chose to locate a plant right on Grand Trunk property because of the Direct Automotive Rapid Transit (DART) service the company developed. DART is a short train that loads parts directly at the plant and delivers them to the assembly site quickly and in correct assembly sequence.

Grand Trunk has broadened its reach by forming partnerships with other railroads and has a thriving international, intermodal service—including ships, container trains and trucks. Eighty-five percent of its shipments involve other carriers and its partner railroads report cargo positions electronically via RAILINC, the national railroad network.

Thanks to EDI, 96 percent of Grand Trunk's billing is correct. Such accuracy is a critical aspect of good service. EDI also lets the company transfer bills of lading to partner railroads. Grand Trunk's network faxes cargo arrival notifications to customers, detailing how much time they have to unload the cars. Smaller customers who don't use EDI can dial into Grand Trunk's computers to trace cargoes and leave E-mail for sales reps.

Grand Trunk recently launched a formal quality program and has started to educate management and union workers in the quality process. It is working to expand the scope of its EDI to include repair information and reimbursement. The company also encourages standardization by requiring identification sensors on the side of every railcar.

—M. O'Leary

Quality Leaders in Transportation

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
ABF Freight System Inc. Fort Smith, Ark.	\$800 M	Jerry Yarbrough Sr. VP	Relies on EDI, quick response and satellite tracking to deliver JIT service; asks its carriers to audit its service
Alaska Airlines Inc. Seattle		Leif B. Haslund Assistant VP/Administrative Services	Management has successfully geared all operations toward a high-service product and a high cost structure to attract business travelers
American Airlines Inc. Fort Worth, Texas	\$11.7 B	Max D. Hopper Sr. VP	Facilitates reservations for itself and other airlines; heavy training and high expectations built into the system; extremely efficient customer front end
American President Companies Ltd. Oakland, Calif.	\$2.4 B	James S. Marston Sr. VP & CIO	Railroad partnerships, international transport network enable customized transport packages; sophisticated understanding of information; managers trained in quality and put on quality teams
Carolina Freight Corp. Cherryville, N.C.	\$7.38 M	John W. Rudasill Jr. Pres./Carrier Computer Services Inc.	Established a quality program in 1985 emphasizing accountability and the use of technology to support the highest standards of customer service
Conrail (Consolidated Rail Corp.) Philadelphia	\$3.4 B	Robert O. Wagner VP/IS	Creates services to meet customer demands, such as SteelNet, which provides more frequent service for steel customers; reliable, frequent reporting; involved in intermodal transport
Federal Express Corp. (Info. & Telecomm. Division) Memphis, Tenn.	\$7 B	Ron J. Ponder Sr. VP & CIO	Only service company to win the Baldrige Award; employees are friendly, courteous problem solvers; leadership has created culture of people and quality supported by systems and senior management behavior
Grand Trunk Western Railroad Detroit	\$350 M	Don Gagen Assistant VP/Information & Control Systems	Strong service provider to automotive industry; developed sophisticated tracking system with Union Pacific; aggressive internal quality program
Union Pacific Railroad Bethlehem, Pa.	\$7 B	James A. Shattuck VP/Information & Telecommunication Technology	Sets standards for developing quality operations in many areas: training, measurements, customer-satisfaction ratings, customer service center
United Airlines Elk Grove, Ill.	\$11 B	J. Donald Karmazin VP/MIS	On-time and in-flight service considered "phenomenal"

quick, easy reservations.

Technology helps freight carriers support tracking and reporting via the scanning of bar codes on shipped items, the results of which can then be downloaded to central repositories for real-time reference, or through the manual recording of packages' positions into a computer. Companies such as ABF Freight have deployed satellite tracking to give their customers information on the location of valuable or perishable cargo at any point en route. Yield-management systems, drawing from databases of information on orders, cargo, rates, prices, times and locations, help freight companies—as well as passenger airlines—determine how to get the biggest load to the most places at the lowest cost. Electronic data interchange (EDI) lets carriers offer easy ordering, billing and account reconciling to high-volume customers. By automating manual tasks, EDI also greatly reduces billing and order errors. Integration with manufacturers' quick-response inventory

systems allows shippers to deliver goods as the manufacturing plant or retailer needs them, thereby reducing revenues lost through delays as well as the need for costly warehousing space.

Although technology plays an important role in providing information and measuring performance, carriers still have much to learn to use it to their best advantage. "I constantly hear from clients that they measure anything and everything that you can think of," said one consultant, "and inevitably, they haven't set internal performance standards or standards for the output of a specific job. They need relevant information to assess the causes of quality failures."

Industry watchers agree that, from a strategic standpoint, transport companies must stop looking at themselves as simple service providers and start becoming part of their customers' business processes. For passenger airlines, this means adding service, fare incentives and better reporting features to attract more

corporate accounts. For freight carriers, it means supporting the manufacturing and delivery processes of their customers through greater technology integration, and furthering their commitment to EDI and quick-response systems.

Above all, management must make a commitment to quality through training and procedures. Alaska Airlines and Federal Express are known for cultures driven from the top down by a commitment to customer service, problem-solving and respect for people. Federal Express employees are friendly, courteous problem solvers, according to one consultant, and the company leadership has worked hard to support its quality culture with systems and senior management behavior.

"There are a lot of companies that are too busy trying to survive to pay attention to what seems like an industry fad," said one analyst. "But success goes back to the confidence factor: whether the customer believes in you or not." □

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UTILITIES

A HIGHER POWER

Increasingly, electric companies are seeing the light on quality, implementing programs that address issues ranging from conservation to improved customer service

Until a power outage causes computers to go down, lights to go out and elevators to stop running we give little thought to the quality of our electric service. Yet, in an industry as complicated as electric power, quality is critical to ensuring public safety, maintaining competitive rates, preserving energy resources and meeting the routine demands of customer service.

Total quality management (TQM) has not exactly taken the utilities industry by storm, however, and information technology contributes primarily in such areas as customer service, management tracking and plant operation. One judge, a financial analyst, noted that most utilities today are investing to bring their IS up to state-of-the-art (see related story, Page 87).

As a result of its quality program, though, Florida Power & Light has received considerable notice, and in 1989 was the first American company to win the Deming Prize, Japan's equivalent of the Malcolm Baldrige National Quality Award. Most of the

management that led the company to that prize has since left, however, and sources close to FPL said a restructuring has de-emphasized certain aspects of the quality process. One source estimated that FPL's quality efforts today are only 50 percent of what they were a year ago. (An FPL official confirmed that there have been management changes but declined to comment further.)

Nevertheless, FPL's prize-winning success encouraged others in the industry to follow suit. New England Electric System (NEES), for example, adopted TQM as a corporate philosophy last year, and Wisconsin Electric Power uses total-quality methods to involve meter readers and bill collectors in improving customer service. Wisconsin Energy is known for its competitiveness in drawing industrial customers

HONOR ROLL

Carolina Power & Light Co.

Duke Power Co.

Florida Power & Light Co.

New England Electric System

Northeast Utilities

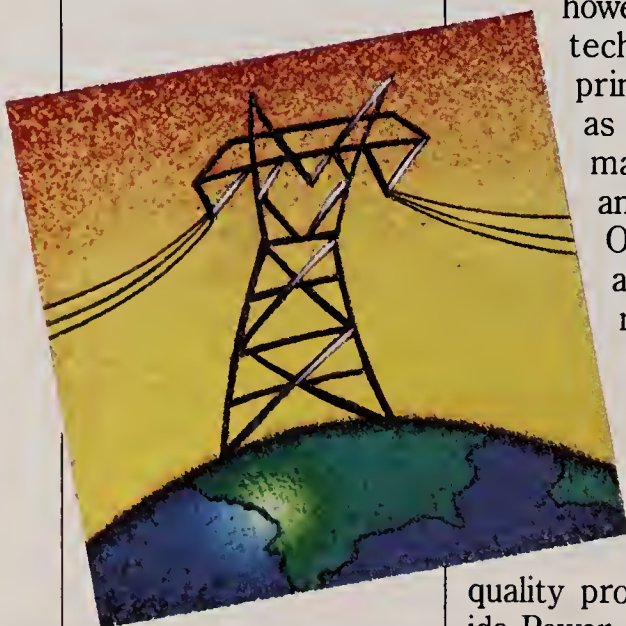
Pacific Gas & Electric Co.

Puget Sound Power & Light Co.

Seattle City Light

Southern California Edison Co.

Wisconsin Electric Power Co.



BY LESLIE GOFF

Plugging IS into the Grid

The ground-breaking achievements that put New England Electric System (NEES) of Westborough, Mass., on the CIO-100 list were won in large part without a contribution from the company's information systems group. Until recently, top management viewed IS as a necessary evil, according to Eric Cody, the utility's vice president and director of information services. "We have been a low-cost information provider," Cody added, "and we have had a low service level."

About a year ago, however, top management began to rethink the IS role. Cody was promoted to his current post from a position on the regulatory side of the company because management wanted someone with a strategic view of the business. At the same time, management was inaugurating a total quality management program. "IS is business-driven, not technology-driven, so we will have a close relationship with the quality effort," Cody said.



ERIC CODY: *With other departments' support, he convinced management that investment in IS will pay off.*

Nowhere is this new IS-business partnership more evident than in the approval of a five-year IS plan that calls for a "significant" increase in IS spending, despite New England's sagging economy. (Cody declined to give specific numbers but characterized the increase as a "percentage [of revenue] that would be considered high in any industry.") The company, which last year had its weakest sales growth since 1974, is expecting a 2 percent decline in

electric sales this year with little or no recovery in 1992. Approving the new IS strategy was "an important recognition on management's part that the investment will really pay off," Cody said.

Winning management's good favor was no accident. IS garnered support among the business units by getting department heads to sign systems benefits contracts that guarantee departments will invoke budget reductions to reflect the benefits of systems delivered.

Under the five-year plan, dubbed NEES Information Strategy, IS will redesign such critical business systems as accounting and budgeting, which are more than 20 years old, as well as add new applications to address customer service, conservation and load management, regulatory requirements and other areas of the business. A strategic initiative is to network the business, reduce the number of vendor platforms now in use and implement an umbrella security system. "We've adopted a total quality management philosophy here," Cody said, "and that has a direct and profound bearing on information planning and management."

—L. Goff

to the state.

Meanwhile, Carolina Power & Light has been practicing TQM for about five years. It is recognized as being responsive to customer problems and gets high marks for attention to customer service. The company pays attention to details that have earned it a high rate of customer satisfaction: Sight-impaired customers can get their bills in large print or braille; Automated Payment Processing systems in local offices let customers access on-line, real-time information about their accounts; Customer Service Centers are open from 7 a.m. to 9 p.m. to provide more telephone lines and longer hours for consumer inquiries. In an industry where the product is taken for granted until something goes wrong, high customer satisfaction cannot be overvalued.

One promising trend toward enhancing customer satisfaction consists of doing more with less—conservation. Although nuclear power is still touted as a long-term solution to U.S. overdependence on foreign oil and nonrenewable resources generally, it remains a complex, high-risk, potentially menacing technology that has yet to deliver clear economic benefits, and some of the judges expressed reservations about it. An ideal solution would be to eliminate the need for new plants entirely, or at least reduce it significantly. One CIO-100 judge noted that environmentally aware consumers are willing to pay higher premiums to achieve a cleaner, safer environment. "So the utility has a role not just in providing kilowatt hours, but also to help the consumer invest in energy-conscious technologies," the judge said.

Pacific Gas & Electric (PG&E), Southern California Edison (SCE), Puget Sound Power & Light, NEES, Northeast Utilities, and Seattle City Light were all cited as utilities that are proactively working with customers and regulators to treat conservation as a priority.

For example, a technique known as least-cost planning allows a utility to systematically evaluate all energy resources to determine which will be

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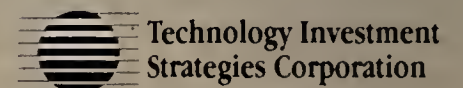
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Quality Leaders in Utilities

COMPANY/LOCATION	ANNUAL REVENUES	TOP IS EXECUTIVE	REASON FOR SELECTION
Carolina Power & Light Co. Raleigh, N.C.	\$2.6 B	R. Thomas Dwyer VP/IS	High customer-satisfaction rating; responds quickly to problems
Duke Power Co. Charlotte, N.C.	\$3.7 B	G.E. Stubbins VP/IS	Innovative rate controls, cost management
Florida Power & Light Co. Juno Beach, Fla.	\$6.3 B	William A. O'Brien VP/Info. Mgmt.	Effectively forecasts energy needs
New England Electric System Westborough, Mass.	\$1.75 B	Eric P. Cody VP/Dir. IS	Progressive user of demand-side management
Northeast Utilities Berlin, Conn.	\$2.6 B		Committed to conservation and efficient energy use
Pacific Gas & Electric Co. San Francisco	\$9.5 B	John C. Danielsen VP/Computer & Telecommunications Services	Strong customer orientation
Puget Sound Power & Light Co. Bellevue, Wash.	\$889.4 M	Robert D. Nelson Dir./Corporate IS	Treats conservation as energy resource
Seattle City Light Seattle	\$203 M	May Gerstle Dir./IS	Has low-cost resource base
Southern California Edison Co. Rosemead, Calif.	\$7.2 B	John R. Fielder VP/IS	Strong, varied alternative energy programs
Wisconsin Electric Power Co. Milwaukee	\$1.5 B	Tom Kelton Dir./IS	Involves all employees in customer service

most cost-efficient over the long run. Innovative utilities are also examining demand-side management—looking for ways to reduce consumer demand and essentially treating conservation as a resource in itself. And through conservation and load-management (C&LM) programs, utilities can manage such peak-usage times as the dog days of August and the chilly nights of winter by inducing part of the customer base to cut their energy usage during those times. For instance, a utility may offer rebates to customers willing to go without air conditioning on summer afternoons, thereby lowering overall usage during ordinary peaks. Following such practices can conserve enough energy to eliminate an entire power plant.

"The push among conservationists is that it should be as profitable for a utility to implement a least-cost plan as a traditional plan," one judge said. "The company will sell fewer kilowatt hours, but that will not impose a penalty on it."

NEES, which serves Massachusetts, Rhode Island and New Hampshire, pioneered customer-oriented C&LM programs and has raked in sizable profits at the same time, making it a regulator's darling. The company spends a higher percentage of revenue on conservation than any

Innovative utilities are looking for ways to reduce consumer demand and are essentially treating conservation as a resource in itself.

other utility, and estimates that it has made about \$10 million in doing so. NEES worked out a deal with its local regulatory commissions under which the utility earns a profit incentive in the form of a rate increase if it reduces energy usage by a predetermined amount. The energy saved eliminates the need for new plants, so customers still end up paying less than if they had to support a new plant in their area. "Customers get 80 percent of the savings and NEES gets 20 percent," according to a company spokeswoman.

Puget Sound also was one of the first companies to redefine conservation as a resource, judges said. In the '70s, for instance, the company offered customers rebates of 75 percent of the cost of making residential and commercial site improvements

that optimized energy efficiency.

Two large California utilities, PG&E and SCE, are particularly attuned to their customers' environmental sensitivity. PG&E is committed to meeting 75 percent of its resource needs in this decade with demand-side management. For instance, in hilly northern California, it uses electricity at night, when demand and costs are lower, to pump water up to high altitudes. During the day, when demand is high and electricity is expensive, it uses the stored water for hydroelectricity.

SCE conducts extensive customer-oriented research and development to improve industrial and commercial customers' ability to reduce pollution, judges said. The utility also employs myriad alternative energy forms. In the desert, for example, huge reflectors heat giant drums of water, which then produce steam to run turbines.

What these companies have in common is a commitment to customer satisfaction. "That is brought about by management," a judge said. "These are the ones that really push to the point where they get a 95 percent customer satisfaction rate." □

Leslie Goff is a freelance writer based in New York.



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WHO, WHAT, WHERE, WHEN...

Some vital statistics on the CIO-100
organizations and their CIOs

COMPANY/LOCATION	REVENUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
ABF Freight System Inc. Fort Smith, Ark.	\$800 M	\$12 M	150	Jerry A. Yarbrough Sr. VP	IS, Eng., Fin., Gen. mgmt., Ops.	CEO	1	23	16
AT&T New York	\$37 B	less than \$1 B	less than 5,000	William F. Osi Jr. VP/Information Management Services	IS, Acctg., Fin., Gen. mgmt., Mktg., Ops.	Vice chairman & CFO	2	22	2
Abbott Laboratories Chicago	\$6 B	additional information not available							
Alaska Airlines Inc. Seattle			79	Leif B. Haslund Asst. VP/Administrative Services	IS & Accounting	Head of admin.	2	16	16
American Airlines Inc. Fort Worth, Texas	\$11.7 B	\$423.7 M (airline) \$260.9 M (other)	3,750	Max D. Hopper Sr. VP	IS & Gen. mgmt.	CEO	1	19	6
American President Companies Ltd. Oakland, Calif.	\$2.4 B	\$74 M	395	James S. Marston Sr. VP & CIO	IS, Gvt., Ops.	CEO	1	3.5	3.5
Analog Devices Inc. Norwood, Mass.	\$485 M	\$21 M	150	Gregory F. McHugh Dir./IS	IS, Eng., Telecom.	CFO	2	2	2
Apple Computer Inc. Cupertino, Calif.	\$5.7 B			Deborah A. Coleman VP/IS & Technology	IS, Acctg., Eng., Fin., Gen. mgmt., & Mfg.	CFO	2	10	1.5
Au Bon Pain Boston	\$60 M	\$700 K	5	Mark Factor Dir./MIS	IS, Acctg., Fin., Gen. mgmt., Consulting	COO	2	3	3
Banc One Corp. Columbus, Ohio	\$225 M	\$80 M	750	David M. Van Lear Pres. & CEO/ Banc One Services Corp.	IS & Finance	Chairman	1	5	2
BankAmerica Corp. San Francisco	\$110 B in assets		4,500	Martin A. Stein Exec. VP/Head of BankAmerica Systems Eng.	Finance	Chairman & CEO	1	1	1

COMPANY/LOCATION	REVENUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Barnett Banks Inc. Jacksonville, Fla.	\$32 B in assets	\$75 M	600	Jonathan Palmer Chief Tech. Exec.	IS, Fin., Gen. mgmt., Mktg., Ops., Consulting & brokerage	President/COO	1	1	1
Beth Israel Hospital Boston	\$285 M	\$10 M	80	Robert F. Messier Dir./MIS	Medicine, IS, Gen. mgmt.	CFO	3	15	15
Black & Decker Corp. Towson, Md.	\$5 B	\$125 M	800	Sid Diamond VP/Worldwide IS	Marketing	Exec. VP/CFO	2	3	3
Borland International Inc. Scotts Valley, Calif.	\$226.8 M	\$9.5 M	24	Bruce Runyan Dir./MIS	IS, Eng., Ops., Research, Physics	CFO	2	3	3
Bose Corp. Framingham, Mass.	\$400 M	\$6.5 M	60	Warren Harkness Dir./IS	IS, Eng., Mktg., Ops., Elec. eng., Comp. science	CFO & VP/Finance	2	6	6
Bristol-Myers Squibb Pharmaceutical Group Princeton, N.J.	\$5.3 B	\$48 M	342	Keith N. Kebel VP/IS	IS	CFO	2	3	1
Buick Motor Division/General Motors Corp. Flint, Mich.			7	Charles W. Smith Mgr./Sales IS	IS	Gen. Dir./Merchandising	4	30	2
C&S/Sovran Trust Co. Atlanta & Norfolk, Va.	\$5.4 B	\$160 M	900	George Budd Group Exec. VP	IS, Eng., Fin., Gen. mgmt., Ops.	CFO	3	12	1
Cadillac Motor Car Division/General Motors Corp. Detroit	information not available								
Carolina Freight Corp. Cherryville, N.C.	\$7.38 M	\$12.2 M	103	John W. Rudasill Jr. Pres./Carrier Computer Services Inc.	IS & Engineering	Senior VP/Corporate Services	3	16	2
Carolina Power & Light Co. Raleigh, N.C.	\$2.6 B			R. Thomas Dwyer VP/IS					
Citicorp New York	\$14.6 B	\$1.5 B	8,500	Colin Crook Sr. Technology Officer	IS, Eng., Gen. mgmt., Mktg.	CEO	1	1.25	1.25
Cleveland Clinic Foundation Cleveland	\$660 M	\$22.6 M (operating) \$4.1 M (capital)	182	Michael L. Jones Chairman/Medical IS	IS & Gen. mgmt.	Chief Admin. Officer	2	5 mos.	5 mos.
Compaq Computer Corp. Houston	\$3.6 B	\$51 M	550	Fred P. Jones Dir./Information Management	IS, Acctg., Gen. mgmt.	CFO	3	5	5
Conrail (Consolidated Rail Corp.) Philadelphia	\$3.4 B	\$94 M	620	Robert O. Wagner VP/IS	IS, Acctg., Fin., Gen. mgmt., Mktg., Strategic planning	Sr. VP/Corporate Systems	2	new hire	
Cypress Semiconductor Corp. San Jose, Calif.	\$225 M	1.5% of revenues	25	Rick Foreman Dir./Strategic Systems & Admin.	IS, Eng., Fin., Gen. mgmt., Ops.	CFO	2	8	7
Delco Products Division/General Motors Corp. Kettering, Ohio	information not available								
Digital Equipment Corp. Maynard, Mass.	\$14 B	5.5% of revenues	6,200	Dan Infante VP/Info. Mgmt. & Technology	Accounting	Head of admin.	2	18	1.5
Domino's Pizza Ann Arbor, Mich.	\$2.65 B	\$4.8 M	49	Ken Herr National Dir./IS	IS & Finance	VP/Admin. & Finance	2	4	1
Duke Power Co. Charlotte, N.C.	\$3.7 B	\$102 M	752	G.E. Stubbins VP/IS	IS, Eng., Mktg., Ops.	Sr. VP/Generation & IS	3	29	9
Eli Lilly and Co. Indianapolis	\$5 B	additional information not available							

COMPANY/LOCATION	REVENUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Federal Express Corp. (Info. & Telecomm. Division) Memphis, Tenn.	\$7 B	2.5% of revenues	2,000	Ron J. Ponder Sr. VP & CIO	IS	COO	2	15	9
First National Bank of Chicago Chicago	\$51 B in assets	\$190 M	1,100	Donald Hollis Exec. VP	IS	Chairman	1	10	10
Florida Power & Light Co. Juno Beach, Fla.	\$6.3 B	\$63.2 M	590	William A. O'Brien VP/Information Management	IS, Gen. mgmt., Consulting	COO	2	6 mos.	6 mos.
Four Seasons Hotels and Resorts Toronto	\$164 M		13	Dan McTavish Dir./IS	IS & Real estate development	Sr. VP/Finance	3	1	1
Fujitsu Ltd.* San Diego, Calif.	\$1.5 B			Fran Moynihan VP/Sales & Operations	Gen. mgmt., Mktg., Ops., Sales	CEO	1	3	3
General Electric Corp. Fairfield, Conn.	\$58.4 B			Edward J. Skiko VP/Information Technology	Engineering	CEO	1	7	7
Glaxo Holdings PLC London	\$5 B	\$170 M	1,200	D.C.B. Home Group IT Controller	IS, Eng., Gen. mgmt., Gov., Ops.	CFO	2	1	1
Grand Trunk Western Railroad Detroit	\$350 M	\$8.6 M	82	Don Gagen Asst. VP/Information & Control Systems	IS, Eng., Gen. mgmt., Ops.	CFO	2	18	4
HCA West Paces Ferry Hospital Atlanta	\$1.14 M	\$750,000	8	Earnest Luttrell Administrative VP & CIO	Accounting	CFO	2	3	3
Hampton Inns Inc. Memphis, Tenn.			100	Christopher Gibbons VP/Information Technology Services	IS, Fin., Ops.	President & COO	2	6	2
Harvard Community Health Plan Brookline, Mass.	\$800 M			James C. Lewis VP & CIO	IS, Gen. mgmt., Ops.	COO	2	4	4
Henry Ford Hospital System Detroit	\$1.2 B	\$17 M	134	Albert A. Sinni Jr. System VP	IS, Fin., Gen. mgmt.	CFO	2	6	6
Hewlett-Packard Co. Palo Alto, Calif.	\$13 B	4.3% of revenues	5,000	Lloyd Taylor Dir./Corporate IS	IS, Acctg., Fin.	CFO	2	24	6
Hitachi Tokyo	information not available								
Honda Motor Corp. Ltd. Tokyo	information not available								
Hyatt Hotels Corp. Chicago	\$200 M		140	John Biggs Senior VP	IS, Acctg., Fin.	President	2	7	5
IBM Corp. Armonk, N.Y.	\$69 B	\$100 M +		Larry J. Ford VP/Information & Telecommunications Systems	IS, Gen. mgmt., Mktg.	Senior VP	2	27	3
Intel Corp. Santa Clara, Calif.	\$3.9 B		600 +	Neal A. Franking VP/Dir. Corporate IS	IS	Office of president (CEO, President, Exec. VP)	2	16	3
Intermountain Health Care System Salt Lake City		2.2% of total operating expenses (centralized)	115	Larry D. Grandia VP/IS	IS, Eng., Gen. mgmt., Mktg., Ops.	Exec. VP		20	5
Johnson & Johnson New Brunswick, N.J.	\$11 B	additional information not available							
J.P. Morgan & Co. Inc. New York	information not available								
Marion Merrell Dow Inc. Kansas City, Mo.	\$2.4 B	\$80 M	300	N. Les Clark VP/IS	IS, Acctg., Eng., Fin., Gen. mgmt., Ops.	CEO	1	15	7

COMPANY/LOCATION	REVENUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Marriott Corp. (including Fairfield Inn and Courtyard) Washington	\$7.6 B	additional information not available							
Matsushita Electric Corp.* Secaucus, N.J.	\$5 B +	\$40 M	220	Hachiro Noguchi Gen. Mgr./Info. & Comm. Systems Ctr.	IS	COO	2	28	2
Mayo Foundation Rochester, Minn.	\$1.18 M	2.9% of total revenues	365 (not including telecommunications)	Walter R. Menning Vice Chairman/IS	IS & Engineering	Chairman/System Support Services	3	3	3
Maytag Newton, Iowa	\$3 B	additional information not available							
McDonald's Corp. Oak Brook, Ill.	\$18.7 B	\$50 M	280	Carl F. Dill Jr. VP/IS	IS & Management consulting	Exec. VP/Ops.	2	8	8
Mercedes-Benz Montvale, N.J.	\$3.9 B	\$18.5 M	105	Vincent L. Morrotti Gen. Mgr./IS	IS & Gen. mgmt.	CFO	2	2	2
Merck & Co. Inc. Rahway, N.J.	\$7.7 B	\$95 M	741	Albert C. Cinorre VP/Computer Resources	Acctg., Fin., Gen. mgmt.	Sr. VP/Eng. & Technology	3	24	7
Microsoft Corp. Redmond, Wash.	\$1.8 B (est.)	\$60 M	200	Neil R. Evans Gen. Mgr./MIS & Corp. Services	IS, Acctg., Fin.	CFO	2	8	8
Mitsubishi Electronics* Cypress, Calif.	\$1.8 B	\$13 M	64	John Nomura VP/MIS	IS, Acctg., Fin., Gen. mgmt., Ops.	Head of admin.	3	10	3
Motorola Inc. Schaumburg, Ill.	\$10.8 B	\$410 M	2,100	Les Shroyer Corp. VP & Dir./MIS & Telecommunications	IS & Engineering	Chief Corporate Staff Officer	2	7	1
National Semiconductor Santa Clara, Calif.	\$1.67 B		500	Pat O'Haren VP/MIS	IS, Acctg., Eng., Fin., Ops., Gen. mgmt.	VP/Operations	2	10	5
NEC Corp. Tokyo	information not available								
New England Electric System Westborough, Mass.	\$1.75 B	\$11 M	184	Eric P. Cody VP & Dir./IS	Load/revenue forecasting, public policy & planning	VP of holding company	2	7	1
Nippondenso Co. Ltd. Aichi, Japan	information not available								
Northeast Utilities Berlin, Conn.	\$2.6 B	additional information not available							
Ochsner Medical Institutions New Orleans	additional information not available			James F. Roberts VP & Dir./IS					
Pacific Gas & Electric Co. San Francisco	\$9.5 B	\$90 M	762	John C. Danielsen VP/Computer & Telecommunications Services	Economics	President	2	11	5
Pfizer New York	\$6.4 B	additional information not available							
Puget Sound Power & Light Co. Bellevue, Wash.	\$889.4 M	\$21.58 M	98	Robert D. Nelson Dir./Corp. IS	IS & Engineering	Sr. VP/Admin.	2	18	11
Regent International Hotels Hong Kong	information not available								
Robert Bosch Corp.* N. Suburban, Ill.	\$1 B +	about \$25 M	104	Jack Kalina Corp. IS Coordinator	IS	CFO	2	6	6
Royal Bank of Canada Toronto	\$107.9 B	\$340 M	1,600	Jim Grant Exec. VP/Systems & Technology	IS, Eng., Fin., Mktg., Ops.	CEO, President, COO	1	23	7
Rush-Presbyterian-St. Luke's Medical Center Chicago	\$660 M	\$18.5 M	165	Patricia Skarulis VP/IS	IS	Office of the president	1	1	1

COMPANY/LOCATION	REVENUES	IS BUDGET	IS STAFF	TOP IS EXECUTIVE/TITLE	BACKGROUND OF IS EXECUTIVE	REPORTS TO	LEVELS BELOW CEO	YEARS WITH ORG.	YEARS IN THIS JOB
Schering-Plough Corp. Madison, N.J.	\$3.4 B	\$18 M	150	R.S. Lyons VP/Corp. IS	IS	Head of admin.	3	3	3
Seattle City Light Seattle	\$203 M	\$2 M	30	May Gerstle Dir./IS	Educ., Gen. mgmt., Gov., Mktg.	Deputy superintendent	3	10	10
Sony Corp.* Park Ridge, NJ	\$4.5 B	\$44.5 M	450	Robert L. Trenchard Sr. VP/MIS	IS & Gen. mgmt.	COO	2	5	5
Southern California Edison Co. Rosemead, Calif.	\$7.2 B	\$129.6 M	930	John R. Fielder VP/IS	IS & Gen. mgmt.	Sr. VP/Corp. & Employee Svcs.	3	21	3
State Street Boston Corp. Boston	information not available								
Storage Technology Corp. Louisville, Colo.	\$1.14 B	\$21.6 M	200	Rich Nortnik Dir./MIS	IS & Gen. mgmt.	Exec. VP/Operations	2	4	3
Stouffer Hotels and Resorts Solon, Ohio			42	Debra Kristopson Dir./MIS	IS	CFO	2	11	3
Syntex Corp. Palo Alto, Calif.	\$1.5 B	3% of revenues	300	Burleigh Cook Corp. VP/Corp. IS	IS	Vice chairman of the Board	2	10	10
Texas Instruments Inc. Dallas	\$6.6 B	\$200 M+	2,500+	Ralph J. Szygenda VP/Information Technology Group	IS, Eng., Gen. mgmt., Mktg., Ops.	Pres./Information Technology Group	3	19	2
Toshiba Corp. Tokyo	\$31.03 B	\$300 M	1,411	Koji Okamoto Gen. Mgr./Total Information & Systems Division	IS, Fin., Gen. mgmt., Mfg.	CEO	1	33	2
Toyota Motor Corp. Torrance, Calif.	\$14 B	\$25 M	280	Doug R. Plescia VP/IS	IS & Business administration	Group VP/Admin. Ops.	3	12	1
TRW Inc. Steering & Suspension Division Sterling Heights, Mich.	information not available								
Union Pacific Railroad Bethlehem, Pa.	\$7 B	\$150 M operating \$30 M capital	1,100	James A. Shattuck VP/Information & Telecommunication Technology	IS & Operations	CEO & Chairman	1	10	1
United Airlines Elk Grove, Ill.	\$11 B		1,100	J. Donald Karmazin VP/MIS	IS	Vice chairman	2	23	10
University of Michigan Hospitals Ann Arbor, Mich.	\$500 M	\$5.5 M	105	Paul R. Vegoda CIO	IS, Educ., Gen. mgmt., Mktg., Ops.	COO	2	1	1
Walt Disney Co. Burbank, Calif.	\$6 B			Sharon D. Garrett CIO	IS & Finance	CFO	2	2	1
Wells Fargo & Co. San Francisco	\$5.9 B	additional information not available							
Whirlpool Corp. Benton Harbor, Mich.	\$6.6 B	\$100 M	500	Richard D. Koeller VP/Information Technology	IS	CFO	2	2	2
Wisconsin Electric Power Co. Milwaukee	\$1.5 B	\$16.5 M	215	Tom Kelton Dir./IS	IS, Gen. mgmt., Mktg.	CFO	3	20	18
Xerox Corp. Stamford, Conn.	\$17.9 B	\$500 M	3,000	Patricia C. Barron VP/Corporate Information	Educ., Gen. mgmt., Mktg.	Exec. VP	2	13	4

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MEET THE JUDGES

Here are the members of the 11 panels that selected the CIO-100 industries and organizations.

THE QUALITY EXPERTS

The following judges, all of whom have a broad knowledge of quality, helped select the 10 industries profiled.

Tony Babinec

Director of applications products group, SPSS Inc., Chicago

***Dorel L. Baila**

VP of quality services, Qualtec Palm Beach Gardens, Fla.

***Harry A. Betker**

Senior consultant, Quality Improvement and Training Services Naperville, Ill.

John A. Clements

Independent quality consultant Milford, Conn.

Armand Feigenbaum

President and CEO, General Systems Co. Pittsfield, Mass.

John Guaspari

VP, Rath & Strong Inc. Lexington, Mass.
Author of *I Know It When I See It; Theory Why* and *The Customer Connection*

***Robert W. Hall**

Professor, Graduate School of Business, Indiana University Indianapolis
Editor, *Target* (published by the Association for Manufacturing Excellence)

***Maureen S. Heaphy**

Principal consultant, The Transformation Network Inc. West Bloomfield, Mich.

***David Mahlke**

Principal consultant, David Mahlke Associates Cedar Rapids, Iowa

***John G. Surak**

Professor, Department of Food Science, Clemson University Clemson, S.C.

Frank M. Tedesco

VP, Juran Institute Inc. Wilton, Conn.

***Harrison M. Wadsworth**

Professor, School of Industrial and Systems Engineering, Georgia Institute of Technology Atlanta

William H. Zierdt

Director of corporate consulting, The International Values Institute, Marian College Fond du Lac, Wis.

THE INDUSTRY EXPERTS

The following panelists offered not only their nominations but their insights as well. Judges who requested anonymity are not included. At least six judges voted in each category.

AUTOMOTIVE

John Aalbrektse

Associate partner, Andersen Consulting Detroit

David J. Andrea

Senior research associate, Transportation Research Institute, University of Michigan Ann Arbor, Mich.

Jim Harbour

President, Harbour & Associates Inc. Troy, Mich.

***Maureen S. Heaphy**

Principal consultant, The Transformation Network Inc. West Bloomfield, Mich.

David Hillburn

President, Hillburn & Associates Rancho Palos Verdes, Calif.

George C. Peterson

President, AutoPacific Group Santa Ana, Calif.

John Phillips III

Executive editor, *Car and Driver* Ann Arbor, Mich.

Dave Power

President, J.D. Power and Associates Agoura Hills, Calif.

Peter Van Hull

Director of automotive advisory services, Arthur Andersen Detroit

Jim Wangers

Senior managing partner, Automotive Marketing Consultants Inc. Warren, Mich.

James Womack

Former research director, International Motor Vehicle Program, MIT Co-author of *The Machine That Changed the World* Brookline, Mass.

BANKING

***Charles Aubrey**

VP and chief quality officer, Banc One Corp. Columbus, Ohio

Nena Groskind

Executive editor, *Banker & Tradesman* Boston

Daniel J. Kreps

Principal, SRI International Menlo Park, Calif.

***Richard A. Marra**

Executive VP, Gryphon Bank Consultants Oak Brook, Ill.

***Victoria L. Taylor**

Director of quality assurance, C&S/Sovran Trust Co. Atlanta

Diogo Teixeira

Partner, Ernst & Young, Center for Information Technology Boston

COMPUTERS & COMMUNICATIONS

Christopher Bogan

Principal, TQM Group Ltd. Cambridge, Mass.

***Edward Fuchs**

Director of AT&T quality excellence center, AT&T Bell Laboratories Holmdel, N.J.

Jack Karp

VP and director of desktop computing strategies service, META Group Westport, Conn.

Dale Kutnick

President and research director,
META Group
Westport, Conn.

Steve Lair

VP and director of microcomputer
systems group, Dataquest Inc.
San Jose, Calif.

Bruce Lupatkin

Managing director of technology
research, Hambrecht & Quist Inc.
San Francisco

Members of Datapro Information Services Group

Delran, N.J.

***Robert J. Osterhoff**

Manager of customer satisfaction &
quality, Xerox Corp.
Rochester, N.Y.

***Laszlo Papay**

Director of market driven quality
assessment, IBM Corp.
Stamford, Conn.

***Marian Steeples**

Quality director, US WEST
Communications Inc.
Denver

Jeb Walker

Senior VP of information technology
practice, United Research Inc.
Morristown, N.J.

Don Young

Senior research analyst, Sanford C.
Bernstein & Co. Inc.
New York

CONSUMER ELECTRONICS & APPLIANCES**Marc Finer**

Director, Communication
Research Inc.
Pittsburgh

***Louise Goesser**

Manager of strategic planning,
Environmental Systems Group,
Westinghouse Corp.
Pittsburgh

***Roderick Gray**

Corporate quality manager,
Bose Corp.
Framingham, Mass.

***Martin Rayl**

VP of quality, SRI International
Menlo Park, Calif.

Norman Remich

Editor-in-chief, *Appliance
Manufacturer*
Solon, Ohio

***Richard Smith**

Manager of quality programs,
General Electric Corp.
Fairfield, Conn.

ELECTRONIC DEVICES**Mark Giudici**

Consultant, Dataquest Inc.
San Jose, Calif.

Daniel Klesken

Analyst, Prudential Securities
San Francisco

Gus Richard

Consultant, VLSI Research
San Jose, Calif.

Michael Slater

Editor, *Microprocessor Report*
Sebastopol, Calif.

William Tai

Analyst, Alex. Brown & Co.
San Francisco

Richard Whittington

Analyst, Kidder Peabody
New York

HEALTH CARE**Doug Anderson**

Director of corporate quality service,
3M
St Paul, Minn.

Gayle L. Capozzalo

Senior VP of strategic development,
SSM Health Care System
St. Louis

Erica Drazen

VP, Arthur D. Little Inc.
Cambridge, Mass.

Joel Ettinger

President, Voluntary Hospitals of
America of Pennsylvania
Pittsburgh

John Glaser

President, Health Care Information
and Management Systems Society
CIO, Brigham & Women's Hospital
Boston

Thomas P. Gore II

VP, The Robert Wood Johnson
Foundation
Princeton, N.J.

Al Johnson

CEO, Medical Center of Delaware
Wilmington, Del.

William B. Munier

President, Quality Standards in
Medicine
Boston

***James Schlosser**

Clinical director, National
Demonstration Project on Quality
Improvement in Health Care,
Harvard Community Health Plan
Brookline, Mass.

Stuart Wesbury

President and CEO, American
College of Health Care Executives
Chicago

HOSPITALITY**Michael Bartlett**

Editor-in-chief, *Restaurants &
Institutions*
Des Plains, Ill.

James Cammisa

Publisher, *Travel Industry Indicators*
Miami

Raymond Goodman

Associate professor, Department of
Hotel Administration, University of
New Hampshire
Durham, N.H.

Author of *Planning, Design and
Marketing of Retirement Facilities*
and *The Management of Service for
the Restaurant Manager*

***Chris Hart**

President, TQM Group Ltd.
Cambridge, Mass.
Author of *Service Breakthroughs:
Changing the Rules of the Game*

James Makens

Professor, Graduate School of Man-
agement, Wake Forest University
Winston-Salem, N.C.
Author of *The Hotel Sales and Mar-
keting Plan Book*

Leo Renaghan

Associate professor of service
marketing, Cornell School of Hotel
Administration
Ithaca, N.Y.

PHARMACEUTICALS**David Anderson**

Senior associate, Index Group
Cambridge, Mass.

***Janet L. Benvenuti**

Director of quality & productivity,
Bristol-Myers Squibb
Princeton, N.J.

Debbie Connor

Director of business information &
planning, Marion Merrell Dow
Kansas City, Mo.

Skip Irving

Director of health care practice,
Arthur D. Little Inc.
Cambridge, Mass.

Bob Reck

VP, Index Group
Cambridge, Mass.

TRANSPORTATION**Christopher Bogan**

Principal, TQM Group Ltd.
Cambridge, Mass.

David J. Cape

President, Princeton Transportation
Consulting Group Inc.
Burlington, Mass.

Jeffrey Carr

Partner and national director of
transportation group, Ernst & Young
Washington

Michael S. Galardi

VP of transportation & operations
group, Temple, Barker & Sloane Inc.
San Francisco
Co-author of *Transportation Strate-
gies for the '80s*
Author of *Creating Profitability: The
Sales and Marketing Challenge*

T. Richard Holt

Senior VP, Wheat First Butcher &
Singer Capital Markets
Philadelphia

Graeme Anne Lidgerwood

VP and senior transportation
analyst, First Boston Corp.
New York

Joanne Rang

Executive director, Management
Systems Council, American Trucking
Association
Alexandria, Va.

William J. Rennie

VP, Temple, Barker & Sloane Inc.
Lexington, Mass.

John G. Sifonis

VP of information & management
services group, Temple, Barker &
Sloane Inc.
New York

Burton Strauss Jr.

Senior VP, Shearson Lehman
Brothers
New York

William Tracey

Executive director, The Maintenance
Council, American Trucking
Association
Alexandria, Va.

UTILITIES**Barry Abramson**

First VP and senior utilities analyst,
Prudential Securities Inc.
New York

***Dorel L. Baila**

VP of quality services, Qualtec
Palm Beach Gardens, Fla.

Ralph Cavanagh

Director of energy program and
senior attorney, National Resource
Defense Council
San Francisco

Steve Cosgrove

Senior consultant, Opinion Research
Corp., Arthur D. Little Inc.
Cambridge, Mass.

Mark Goldsmith

President, Energy Research Group
Waltham, Mass.

Eric Hirst

Corporate fellow, Oak Ridge
National Laboratory
Oak Ridge, Tenn.

Kenneth Kearns

Principal, Kearns & West Inc.
Lexington, Mass.

Robert Marritz

Editor and publisher,
Electricity Journal
Seattle

Edward J. Tirello Jr.

Managing director of utility group,
Smith Barney, Harris, Upham & Co.
New York

**Current or former Baldrige Award
Examiners are noted with an aster-
isk, except in cases where they asked
that their affiliation not be men-
tioned.*

Caveat Emptor

Quality-hungry companies should exercise caution when evaluating consultants. Sometimes the would-be experts can be more hindrance than help.

BY RON ASBURY

Quality in the '90s is both a virtue and a competitive necessity. Everyone wants it, but not everyone has the in-house capability to develop it.

Over the past few years, a raft of quality consultants has appeared, offering to lead American business to the promised land of continuous improvement. The majority are well-qualified and have a track record of helping companies implement successful programs of total quality management. Unfortunately, there are also those who see this new demand as an opportunity to peddle an expertise they don't possess. These would-be gurus do little toward helping a company achieve its goals; in fact, they may set the organization back a few steps by wasting time and money, and by alienating employees.

Consumer Reports and the Better Business Bureau cannot help the company shopping for a quality consultant. But certain practices of less qualified firms should send up red flags to the chary quality director.

Inflated advertising, for example, is an instant tip-off. Increasingly, firms are promising prospective clients that "We can help your company win the Malcolm Baldrige Award." Companies should be immediately suspicious of such a claim; while bona fide gurus can help organizations train staff and refine processes in the spirit of the Baldrige criteria, these criteria are constantly evolving. In addition, Baldrige winners must demonstrate a broad range of measurable results over a period of time: The award is not hospitable to quick fixes or instant makeovers. Other firms may claim to have any number of Baldrige "finalists" among their clients, when in fact the companies referred to were selected to receive site visits. The term "finalist" is not even part of the Baldrige lexicon.

Be wary, too, of firms that offer a one-stop-shopping approach to quality improvement. Even the most respected gurus can't be all things to all people; but opportunists looking to maximize their market share may claim expertise in everything from training hourly employees to performing a comparative analysis against international competitors. Most organizations would be wiser to take the boutique approach to assembling their consultancy programs—determining their needs and then employing a specialist for each niche.

Attempts to foist on the organization a ready-made, inflexible plan should also send up a red flag. Obviously it is both easier and cheaper for a consultant to implement the exact same program over and over again for every client. But a program that



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worked well in one organization might prove completely ineffective in another. The company that commits itself to total quality is committing itself to substantial change. And the consultants supporting that change must be at least as flexible, adapting their programs to fit the company rather than expecting the company to adopt their programs wholesale.

Beware, also, of the consultant who wants to stay locked into an organization for a long time. Ideally, the company will bring in a consultant, introduce the concept, and then build the in-house capability to keep it going. (Some companies are reluctant to hire consultants because they don't have a parallel group in-house to perpetuate the process after the consultant has gone. But consultants should be able to properly prepare any employee with strong communication skills and enthusiasm to help lead the change process. This empowerment also encourages em-

ployee buy-in, particularly at the middle management level.)

A true quality expert, then, will most likely offer a specific service or set of services that can be tailored to meet a company's requirements. But just because a consulting firm does not send up any of the aforementioned danger signals does not mean it is the company's best choice. Additional research must be conducted among the consultant's clients. Consultants who will not readily supply references are sending up the biggest danger signal of all.

The first thing to ask current or former clients is simply whether they would hire the same consultant again. A vehement and well-grounded negative may scuttle the need for further questioning.

The prospective client should also find out if the consultant worked with executives only, or included middle management and even hourly work-

ers in the process. Some consultants who are extremely comfortable dealing with executives may have no facility, and hence no credibility, with lower level employees. And while early stages of the quality improvement process, such as formulating a vision, may concern only those in the upper echelons, a company cannot carry out a successful quality program without buy-in at every level.

Finally, clients should be asked to share some positive changes that the consultant has enabled. If the client has nothing good to say about a consultant, if it has experienced no bottom-line successes or movement toward continuous improvement, the prospective customer should have serious reservations.

But avoiding charlatans is only one consideration. Even the best qualified consultants can do little good if their approach to quality does not conform to the company's present needs and future goals. The services these



firms offer are many and varied. Some focus on training, from basic problem-solving skills for hourly employees to group dynamics and team building for managers. Others concentrate on assessing employee perceptions in order to increase input and motivation. Some help management develop a corporate vision, and show them how to integrate that vision into the business plan. Many consultants specialize in customer satisfaction. Still others are expert in comparative analysis. All approaches are valid, but they are not equally useful to every company.

The task of assessing a company's needs, selecting the appropriate consultant(s) and ensuring continuity after the quality concept has been implemented can best be performed by an in-house quality management team. This specialized staff acts as resource, catalyst and coordinator, ensuring not only that the company retains the best consulting services

available, but that it maintains ownership of the quality process. The importance of the latter responsibility cannot be overstated. Initiatives produced entirely by outsiders often make little impression on employees, who dismiss them as another "Program of the Month." While consultants can expertly carry out surveys and analyze the data collected, companies should be heavily involved in the interpretation of this information and the subsequent formulation of a goal. And in-house quality directors make sure that when consultants leave, their good work stays behind.

Texaco Inc. and its divisions have used consultants at various stages of designing and implementing their quality improvement process, and that input has proven invaluable. The company's approach has been to find a consultant with the desired expertise and together develop a joint initiative for a specific group within the corporation. The initiative then be-

comes a pilot for the entire organization, and if it is successful it is adapted for use by other groups. A consultant-trained Texaco employee rather than the consultant normally leads this deployment.

At Texaco, considerable in-house expertise already exists. But when the company wants to incorporate the latest quality concept into its program, a consultant can expedite the process. Smaller organizations will probably need additional outside help, and it is available, even to those with limited resources, (see Trendlines, page 12).

Implementing a continuous improvement plan demands enormous changes at all levels. The company that enlists qualified outside help goes a long way toward smoothing the process. 

Ron Asbury is director of quality consulting for Texaco Inc., headquartered in Harrison, N.Y.

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Ouellette & Associates Inc.
603 623-7373

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September 22-25
CIO Publishing Inc.
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Tom Peters is a featured speaker at this conference which addresses the issues of workplace literacy, work-based learning, ethnic diversity and skill competencies facing American business today. There is a special focus on how IT can help avoid a crisis

and enhance competitiveness. Registration fees: \$895-\$1,350.

Showcase VI: Advances in Applications Development

St. Louis Airport Marriott,
St. Louis
September 23-26
Washington University
314 935-4792

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14th National Computer Security Conference

Omni Shoreham Hotel,
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October 1-4
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and National Security Agency
301 975-2775

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Company Index

3M	34
AT&T	34
Alex. Brown & Sons	62
America West Airlines	12
American Express	46
Armco Advanced Material Corp.	12
Automotive Advisory Services	42
Bank of America	46
Bankers Trust	46
Compaq Computer Corp.	50
CoreStates Financial Corp.	46
Corning Inc.	26
CSC Index Inc.	12
Cummins Engine	26
Dow Chemical Co.	76
Du Pont	34
Federal Express Corp.	26
First Wachovia Corp.	46
Ford Motor Co.	34
Frito-Lay	34
Furman Selz Inc.	42
General Electric	46
General Motors Corp.	34, 42
Goodyear	34
Harris Bank	46
IBM Corp.	34
IBM Credit Corp.	26
Kidder Peabody	62
L.L. Bean	26, 34
Lenscrafters	34
Lotus Development Corp.	50
Manville Corp.	12
Marion Laboratories	76
Mazda	82
McDonnell Douglas Systems Integration Co.	12
Milliken & Co.	34
Mobay	34

Monsanto	34
Motorola	34
Nestlé	70
Norwest	46
PolySoft Systems Corp.	12
Procter & Gamble	34
Prudential Securities	62
SRI International	46
Sara Lee	34
Silicon Valley Bank	46
Super 8 Motels	70
Synovus Corp.	46
Texaco Inc.	12, 100
Transformation Network Inc., The	42
US Bancorp	46
US Sprint	12
United Technologies	12
Valley National Bank	46
Westinghouse	34
Wilmington Trust	46
Xerox Corp.	26, 34

Advertiser Index

AT&T	33, 81, 97
AT&T Technologies	52
Apple Computer Inc.	18
Bachman Information Systems	C4
Boole & Babbage Inc.	49
CIO Publishing Inc.	44A, 45, 88, C3
Computer Associates International Inc.	2
Data General Corp.	102
Digital Equipment Corp.	C2
Dow Jones Information Services	4
EDS	24
Forbes	65
Fujitsu Ltd.	7
H&W Computer Systems Inc.	61
IBM Corp.	72
Information Resources Inc.	11
Interface Group	85
Intersolv	14
Kimberly-Clark Computer Services	55
MCI	16A
Oracle	91
SIM	75
Software AG	69
Tandon Corp.	36, 58
Texas Instruments Inc.	8
US Sprint	28
Unisys Corp.	78
Xerox Corp.	101

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